THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. XC. No. 2189.] LONDON, APRIL 25, 1905. [57TH YEAR. PRICE 6d.

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— *ESTABLISHED 1830.* —

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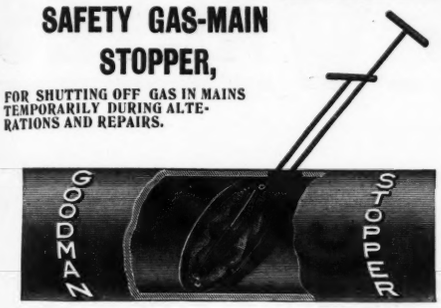

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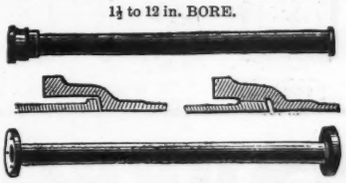

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CHEAP STEAM PRODUCTION.

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SIR,—Some years ago we attached forced draught and special fire-bars to our two Lancashire boilers, with the object of burning coke dust. The load has grown, and last week I had the water and fuel carefully checked, with the following results:—

Water used in boilers from Dec. 9 to Dec. 16, as per Corporation meter .	79,300		
Fuel used from Dec. 9 to Dec. 16: Coke	£	s.	d.
dust—41 tons 4 cwt., at 1s. 11d. .	3	19	0
Washed slack—15 tons 17 cwt., at 6s. 6d.	5	3	2
	£9	2	2

This works out at a fraction under 2s. 4d. per 1000 gallons. Can this result be beaten? I may add that the water-feed to the boilers is heated by the exhaust steam from the engines to 200 deg.

Yours truly,
C. D. LENG.

High Street, Sheffield, Dec. 19, 1904.

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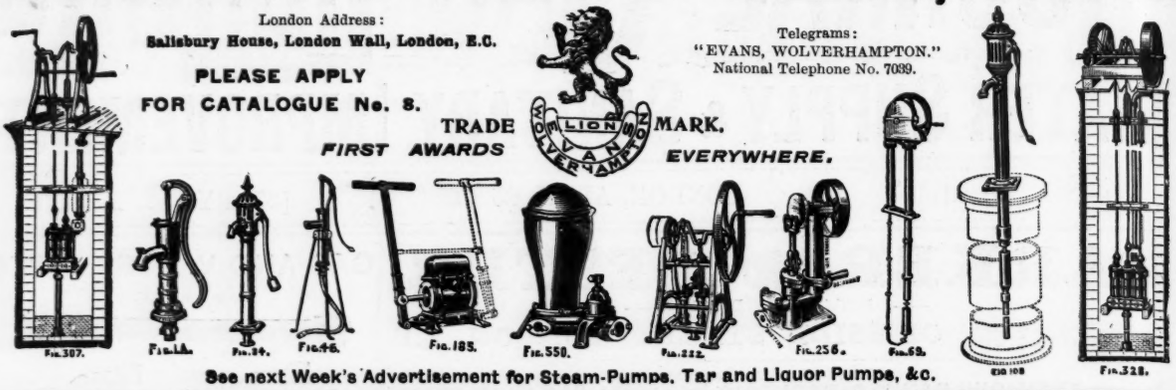

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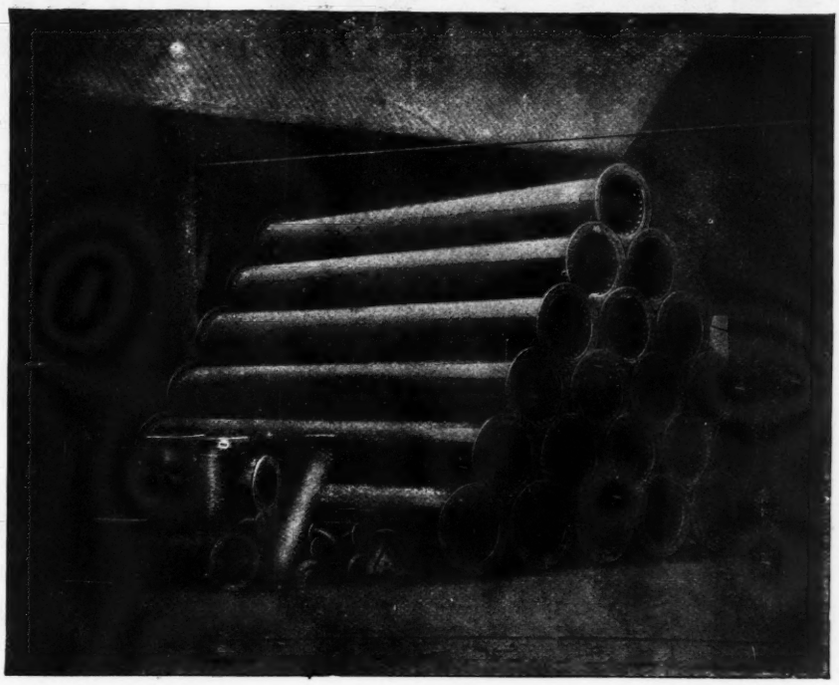

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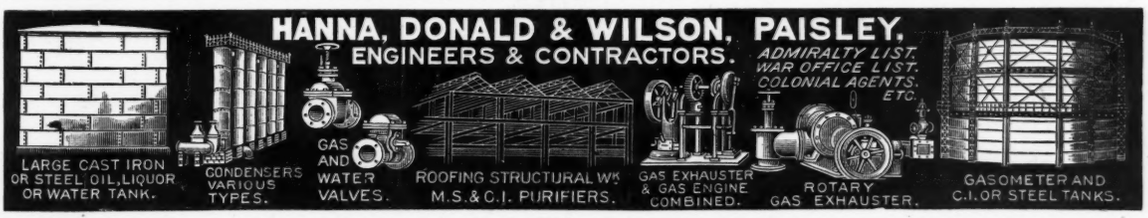
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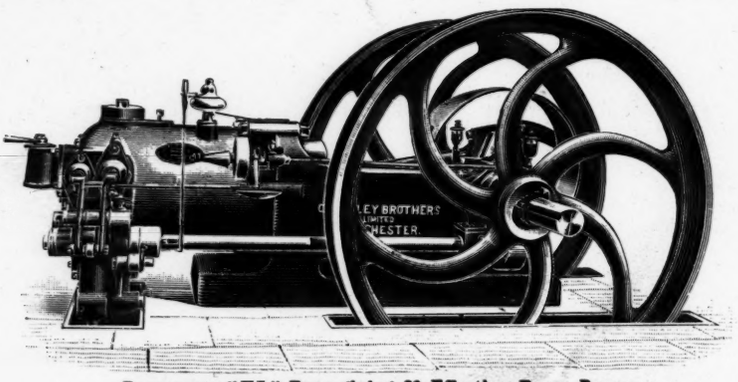

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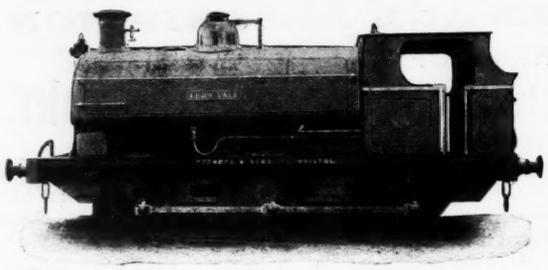

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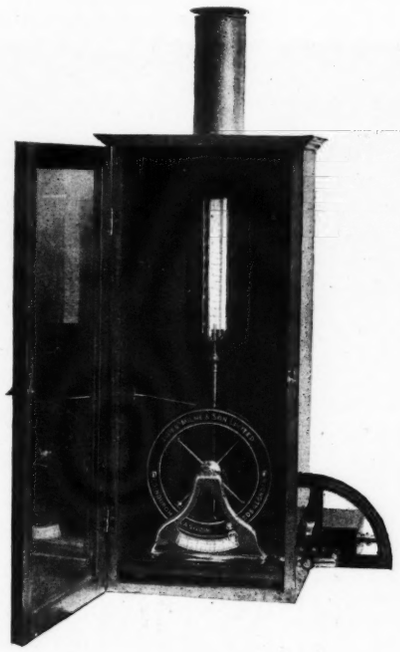

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[See Illustrated Advertisement, April 4, p. 6.]

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The "Hovey" Indicator
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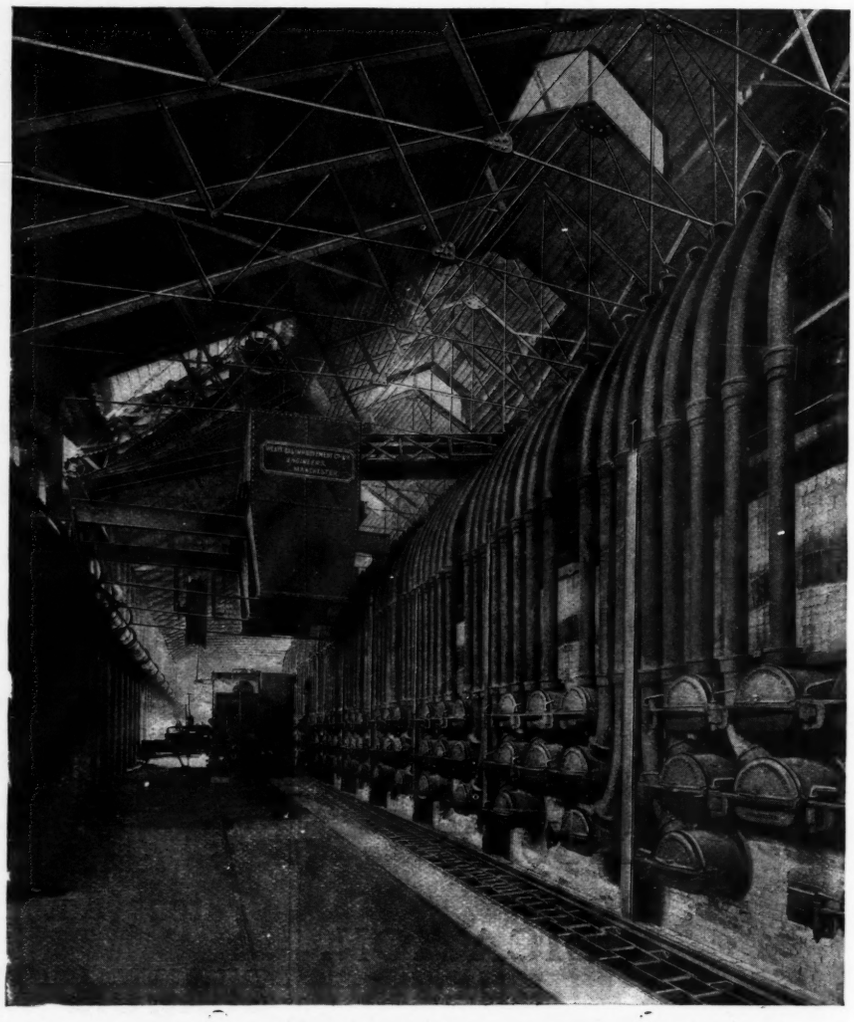

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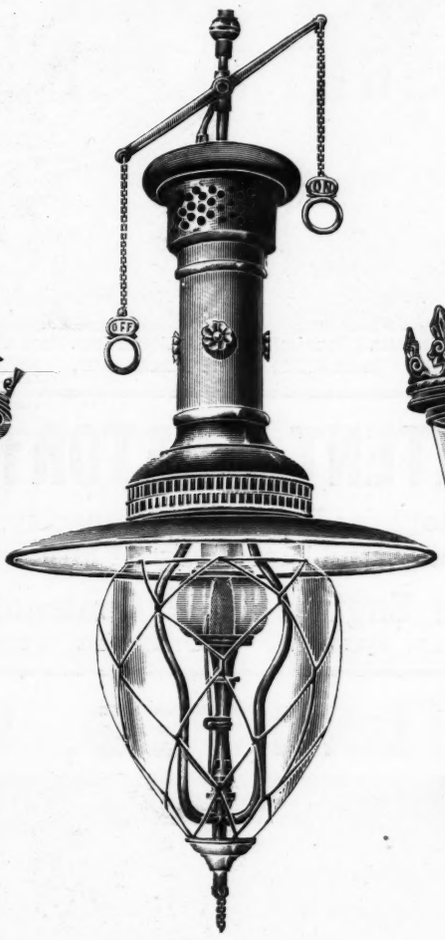

Fig. 607. 600 c.p.
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Fig. 35a. 300 c.p.
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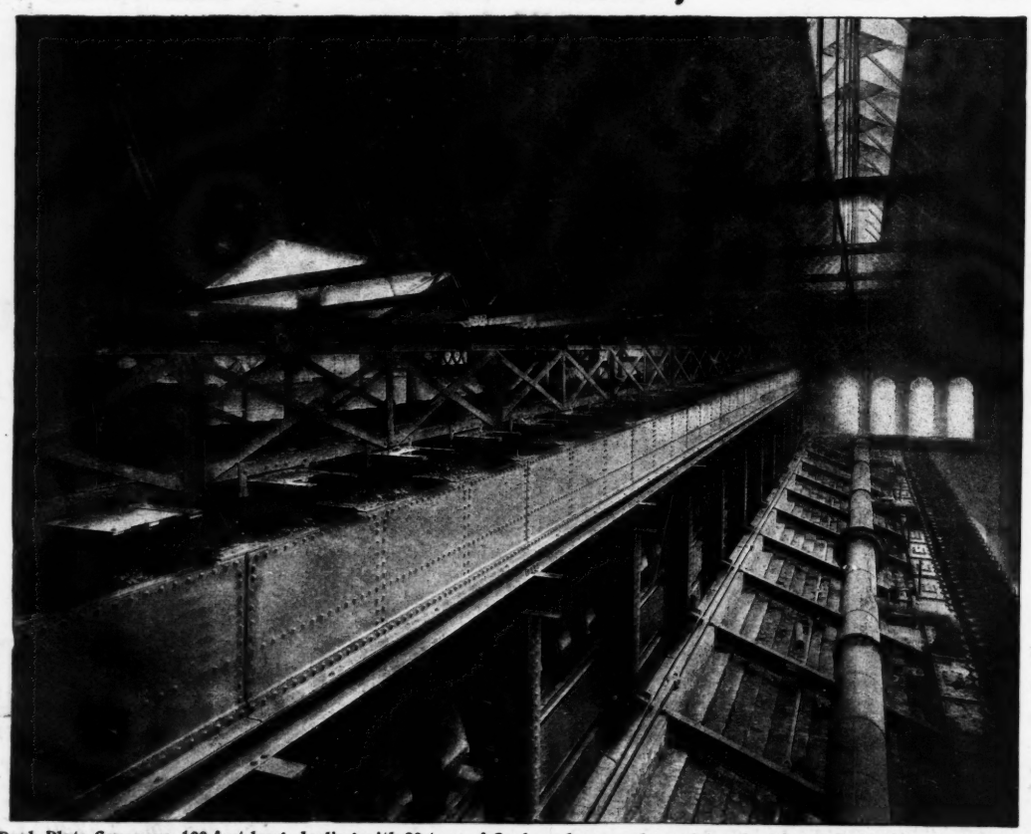

Push-Plate Conveyor, 160 feet long, dealing with 30 tons of Coal per hour, and supplying Coal for 13 Beds of Inclined Retorts.

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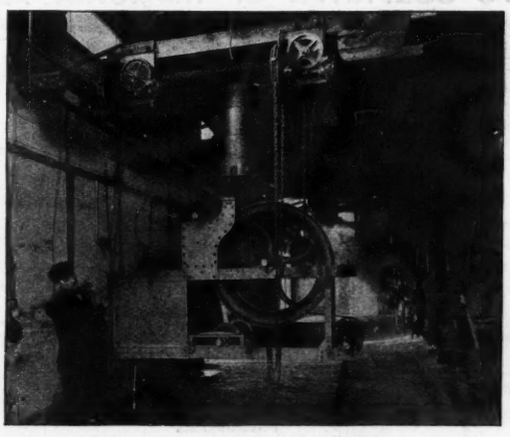

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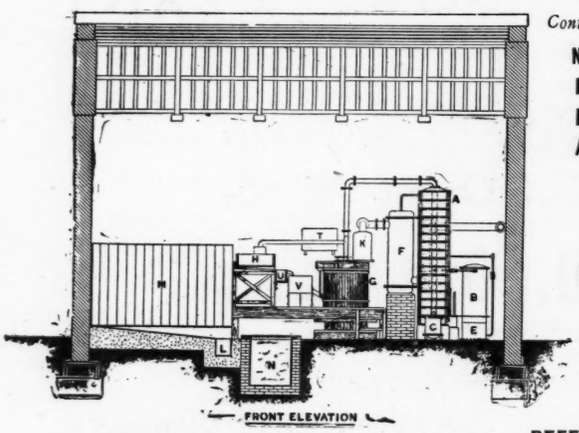

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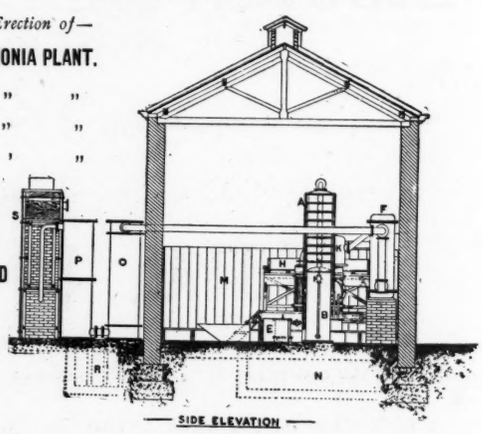

REFERENCES.

A. Large Still (Ammonia).
B. Small Still (Lime).
C. Spent Liquor Valve.
E. Limeing Arrangement.
F. Heater.
G. Saturator.
H. Draining Table.
K. Lead Catch Box.
L. Mother Liquor Well.
M. Sulphate Store.
N. Acid Store Tank.
O. Condenser.
P. Scrubber.
R. Settling Tank.
S. Neutralization Plant.
T. Acid Supply Tank.
U. Mother Liquor Trough.
V. Mother Liquor Receiver.

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Wilton's Patent Neutralizing Apparatus for the Waste Gases from Sulphate of Ammonia Plant.

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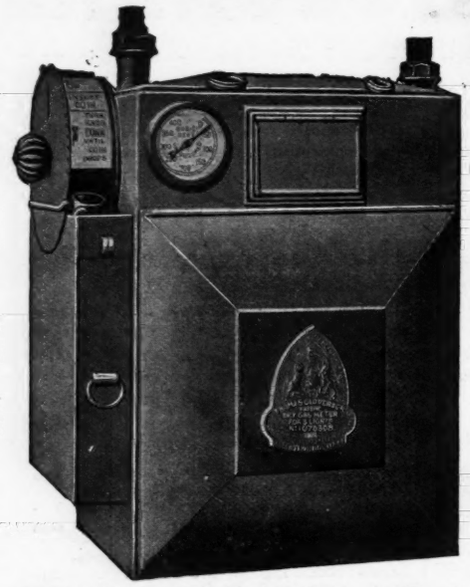

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EDITORIAL NOTES—GAS, &c.

The Government and Workmen's Compensation.

IN a previous issue of the "JOURNAL," a summary was given of the report of the Departmental Committee appointed by the Home Office in 1903 to inquire into the operation of the Workmen's Compensation Act, 1897; and in the number for the 21st ult. attention was drawn to the principal features of a Bill which has been introduced by certain leaders of the Labour party, the object of which is to amend the Act on the lines of the recommendations of this Committee, but which includes also provisions some of which are contrary to those recommendations. We have quite recently given the details of the Government measure which has been introduced for the same object, and which, as was to be expected, adheres much more closely than does the private members' Bill to the Committee's report. It is hardly necessary to say that the Act of 1897 gave for the first time to all those employed in dangerous occupations reasonable compensation for the results of accidents, whether or not the accident was caused by the default of the employer. That this was but justice, having regard to the increasing number of dangerous occupations consequent upon the general use of machinery, and the extension of railways, tramways, and other means of locomotion, is generally admitted; nor does it appear to have borne with undue hardship upon the employers, though its full effect is not yet apparent.

It will be recollected that scarcely had the Act been put into force than it was discovered that costly litigation, which it was one of its objects to do away with, had by no means been put an end to; while difficulties multiplied as to its interpretation and intentions. It was therefore desirable, after several years' working, that an inquiry should be made into its effect; and the Committee entrusted with this work issued a very useful report. They found, as had been anticipated, that the measure has been productive of very great benefit to the employed, and that the amount of litigation was small in comparison with the number of cases settled by agreement. One particular point, however, it was ascertained, had given rise to a considerable amount of litigation—namely, the clause in the Act which gave to workmen the alternative of proceeding either under that Act or under the Employers' Liability Act. This, as was explained by Lord Belper, when introducing the Government measure, afforded an opportunity for unscrupulous advisers, who persuaded their clients to proceed under the Employers' Liability Act when there was very small chance of succeeding. Employers of labour are only too familiar with this class of legal adviser; and many working men know it to their cost. A witness hailing from Scotland told the Committee that out of 43 cases with which he was familiar, and which were sent to a jury under the Employers' Liability Act, only 11 were decided in the men's favour; the amount of compensation recovered being only £1735. The expenses amounted to £3050—an average outlay of £277 in each case.

It is thus quite evident that an amendment of the Act is desirable, if only to put an end to this state of affairs. The Government proposal is that, in a case where the workman had the option of proceeding under the Employers' Liability Act or the Act of 1897, he should continue to have that option; but that if he might recover under the Employers' Liability Act and the employer admitted his liability under the Compensation Act, the procedure should be under the arbitration clauses of the latter Act. Should the workman not be successful in making good his legal claim under the Employers' Liability Act, the Court would at once proceed to give compensation under the Act of 1897, but also order that costs which in its opinion had been incurred by the proceedings having been brought under the wrong Act should be deducted from the compensation awarded. This is likely to have the effect of simplifying the proceedings, and it should reduce the cost of litigation almost to a minimum. One satisfactory feature of the Bill is the proposal to allow old men and partially-disabled men to agree with their employers as to the maximum to be paid, and that they should be allowed not less than 5s. weekly or £25 in a lump sum. It is a misfortune of the Act of 1897 that it bears hardly upon such men, inasmuch as employers naturally desire to limit their liabilities, with the result that the old and infirm have had to suffer. It is much to be hoped that the provision proposed by the Bill may have the desired effect of ameliorating the ever-increasing hardness of their lot.

One important point is the negative character of the Bill in regard to the proposal that payment for compensation should date from the time of the accident in place of, as under the Act of 1897, from the end of the first fortnight after the accident. It is evident that the effect of such an alteration must be to largely increase the liability of employers, since the number of cases for compensation would enormously increase. For the present, therefore, and until the full extent of the liability under existing legislation becomes known, it is wisely determined not to lay on additional burdens. In point of fact, the Bill has been framed in a spirit of moderation, and with a laudable desire to do away with expensive litigation, and secure compensation for the injured at the least cost, without inflicting any undue burden upon industry. It is scarcely to be expected that this will satisfy those extremists who desire nothing less than the total abolition of all "contracting out," payment of compensation from the date of accident instead of after the first fortnight, and abolition of "contributory negligence" as a defence in proceedings instituted for the recovery of compensation. It will, however, commend itself to all who cordially agree with the desirability of recognizing by legislation the increased risks to which the workman is exposed under modern conditions, so far as this may be done with a prudent regard for the maintenance of industrial efficiency.

Taxation of Land Values.

THIS is one of a crop of hardy annuals, which may be said to flourish exceedingly during a period of every session, but which eventually succumb to the exigencies of public business. As an abstract proposition there can be no doubt whatever of the justice of assessing land at its proper value, whether beneficially occupied or not; but in practice such a course is likely to be attended with considerable inconvenience and difficulty. The principal object of the measure which has lately been introduced, under the title of "Land Values (Assessment and Rating)," is stated to be the prevention of the undue holding back of suburban land from building operations; and it is perhaps to be regarded as another sign of the nearer approach of a General Election that it was read a second time last Friday week by a majority of 90, as compared with a majority of 67, by which a similar Bill was read a second time last year.

One reason for the Bill which was strongly insisted upon was founded on the increasing support which is given to it by the local authorities; it being pointed out by Mr. Asquith that, comparing this year with last, there are 200 more municipal bodies supporting the scheme. It may not be unjust to infer that the prospect of an increased rateable value is not without its attractions for local authorities, more especially those who may have embarked in extravagant schemes, and find a difficulty in making ends meet without having recourse to further increase of rates. But it is a matter which obviously requires long and careful consideration lest injustice should be done. It is not with the object of enlarging and extending the powers of taxation of local authorities that this new departure should be undertaken, but rather with the view of adjusting existing burdens more equitably. If this is not to be the sole effect of the proposed change, then the last state is likely to be worse than the

first. Nobody wants to see the local authorities placed in possession of a larger income from taxation than they have at present. Moreover, there is likely to be serious difficulty in making the necessary valuations. For the purposes of the Act, the annual value of land is to be deemed to be an amount equal to 3 per cent. of that for which the land can be sold by a willing seller to a willing buyer. How is this to be ascertained? Land is held in this country under a variety of tenures, each of which affects to a certain extent the value of the land to which it relates; and such valuations are likely to cost a large amount of money. It is estimated that in London alone the expense of separating site from structure, as regards valuation, would not be less than £400,000—other estimates being considerably higher than this; while for the whole of the country the cost of such valuations would be about £18,000,000.

The question then is: What is likely to be the benefit from such an enormous expenditure as this? Can it be altogether just or desirable to relieve occupiers of a part of their burden, and place it upon the owners of land in what are called "urban" districts? Commenting upon this proposal, Lord Balfour denounces it as anomalous and oppressive; pointing out that he himself is a farmer in an urban district where the present rates are 3s. in the pound and the rent about £1 an acre. The land, however, is worth £300 per acre, capital value; so that under this Bill it would be rated at £9 an acre, and the rates would be 27s. It follows that market and nursery gardeners, coal and timber merchants, and, in fact, all who gave considerable employment to labour in urban districts, would have their assessments increased under the provisions of the Bill. If applied to London, as pointed out by Mr. Grant Lawson, Olympia, the Crystal Palace, and Kennington Oval would be rated on the capital values of their respective sites; and this would probubly result in their being overwhelmed with taxation. That there are many anomalies in our present system of levying taxes can be freely admitted; but it may be doubted whether the proposals of the Bill would not create anomalies still more serious. Much as a well-considered alteration of the law dealing with existing defects is to be desired, it would be better to "bear those ills we "have, than fly to others that we know not of."

The Prospects of Rate Relief.

THE agitation over the grievous burden of the rates proceeds; and sooner or later it must end in the Government taking action with the view of altering the present system which gives the municipal authorities so much latitude. Nothing could, of course, be done which would afford immediate relief to ratepayers; and any remedy that might be devised could only possibly attain effective maturity by process of time. The trouble has long been before Parliament; and the only step they have taken has been the reference of the general subject of Municipal Trading to a Joint Committee, whose report, for the moment, looks as though it was only brought into existence as a memorial to the frightful local extravagance of the age. Following on that report, which was the case for Government action, there has been no settled move of any kind on their part; and there are no indications which satisfy as to any intention of their doing so, excepting in a fortuitous sort of way through the Local Government Board. On the contrary, while there is sympathy among Ministers, the signs are that the Government feel too strongly the fatigue of senility to willingly enter now upon the stupendous task of taking steps to produce reform. Mr. Gerald Balfour has not been long at the Local Government Board; but he has already arrived at the conclusion that it would be impossible, by any scheme of legislation, to check the municipal borrowing now going on. It is granted that the reform of local taxation is a complicated question; and that it involves many conflicting interests. But if before anything is done it requires such a favourable combination of circumstances as Mr. Balfour cited when dealing with the Agricultural Rating Bill yesterday week—if we are to wait for the coming of that favourable set of circumstances—then we may relinquish hope of anything ever being accomplished.

These considerations permit the positive conclusion that the present Government are not contemplating any active measures. They have in the latter years of their life missed their opportunity; and their only explanation is the importunate and burdensome nature of national affairs that have set bound to their action on every side. But this has not always been their condition; and this question of municipal extravagance and oppression is not a thing of yesterday. Small comfort is obtained from Mr. Balfour; for we find him also saying that the question, like others connected with local finance, must, in the last resort, be left to the good sense and discretion of the ratepayers. If that is the last resort, then adieu to hope of reform; for the tendency of the time is to remove municipal bodies as much as possible from the control of the ratepayers, and then to cast on the ratepayers blame for what has happened or may happen. "If "the ratepayers fail in their duty," says Mr. Balfour, "no "doubt not only considerable local, but considerable national "inconvenience will arise." But what will the ratepayers say if the Government fail in their duty? It is strange for a member of the Government to talk in this way, when it is remembered that those who are of the largest and most influential of ratepayers—such as Gas, Water, and Railway Companies—are denied the unquestionable right of even the cottage tenant. Take the case of the Railway Companies having property within the Metropolitan area. The total rateable value of the Administrative County of London, according to the valuation lists which came into force early this month, subject to appeals, is £41,657,244; and of this rateable value the railway property alone in the county is represented by £2,307,864. Yet these Companies have no title to vote under the existing order of things. The same in the case of the Gas Companies. It is a truly disgraceful position; but the Government do not evince any desire to enable them to have a voice in the selection of the men to whom is confided the duty of spending the money to the sum of which the Companies contribute so considerably. It is very fine, under such circumstances, for Mr. Balfour to speak of the ratepayers "failing in their duty," when those most interested and best able to take effective measures in exercising control are locally debarred from any part in the duty and responsibility.

In the midst of the present confusion and general complaint, there is some satisfaction in seeing that the House of Commons are determined to uphold the Local Government Board in their efforts to produce a better sense of moderation on the part of local authorities by curtailing the period for the repayment of loans. The Swansea Corporation Bill has been the example. Before the Select Committee who considered this Bill, the Corporation struggled hard to get their loans unified in respect of repayment, by extending the limit imposed upon certain amounts from thirty years to the sixty years at which others stand, and which in effect gives them the very respectable average of 45 years. One cannot help feeling sorry for ratepayers who, through this difference in the periods of repayment, have to suffer an increase of 3½d. in the pound on their rates. But it is the only way to put a spoke in the fast-revolving wheel of extravagance and municipal adventure; and, therefore, we are pleased that the House upheld the decision of the Select Committee to abide by the determination of the Local Government Board. Complaint has lately been made of the Board that, while they are imposing restraint by this means upon local authorities, they swallow without protest the extravagant schemes of those authorities. The allegation is not justified by recent example. In the last year or two, the Board have prevented the carrying out of electric lighting schemes of a scandalously speculative order; and, only within the last few days, they have refused to allow Hammersmith to squander £7861 on the electric wiring and fitting up of their new workhouse, believing that the work can be done for much less. While the Board continue on these lines, nobody but the local authorities themselves will find anything to complain of in their action. It is something to be thankful for that at all events one Government department take a broad view of their duty in the matter of protecting the ratepayer. Even the London County Council—prodigal themselves—are likewise apparently becoming rather alarmed; for last week a loan to the Poplar Borough Council for paving works was only granted by them for five years, or half the ordinary period allowed for such work. The Poplar Council, however, are under the cloud just now of being the heaviest-rated borough in London.

Looking at the question all round, one cannot see (excepting the restriction that the Local Government Board can bring to bear upon the matter of expenditure) that there is any prospect of definite action having for its purpose eventual relief for the long-suffering ratepayer.

Gas Profits and the Rates.

The varied nature of the interests affected by the method of conducting by a municipality its trading undertakings has been well illustrated by a controversy which has lately taken place in the columns of one of the Rochdale papers. A member of the staff, in the course of one of his notes, ventured the remark that if the Gas Committee were able to report another big profit, there should be an early reduction in the price of gas, on the familiar grounds that needlessly high-priced gas is unfairly handicapped in the competition with electricity, and that a system which aims at high profits rather than the maximum remunerative sale gives what is practically a grant-in-aid to those ratepayers who are not customers of the department. This opinion—which has frequently been advanced in the pages of the "JOURNAL"—was made the subject of a wild attack by a correspondent signing himself "A Large Ratepayer." Much of his letter was of a very personal nature, and was entirely foreign to the point that is at issue. But setting this part aside, it seems that his argument is that the rates of Rochdale are collected mainly from two very large classes—millowners and owners of house property—and as the millowners are large users of gas, it must be the owners of house property who are said to receive a grant-in-aid from the gas profits. This, in fact, he (though apparently unwillingly) proves is the case; for he points out that if the gas profits are utilized to reduce the price it will benefit the tenants, whereas any consequent increase in rates will fall upon the landlords, by whom they are paid. Just so; and who is it that is most entitled to consideration—the consumers, to whom solely the prosperity of the undertaking is due, or the landlords, who merely wish to be relieved of a portion of their burden? "A Large Ratepayer" thinks it is unfair for him to pay 10s. in rates for each 1d. his gas charge is reduced; and he would naturally much prefer that someone else should pay his 10s. for him. But would this be any fairer? Direct taxation might be the best means of showing the working classes just what local government is costing them; but in advocating it, "A Large Ratepayer" only further demolishes his own argument, for what more striking example of indirect taxation can there be than the inclusion in the price charged for a commodity to a portion of the citizens of a sum that would otherwise have to be paid as rates by the whole of the ratepayers? Cheap gas, especially in an industrial centre, is an inestimable boon; and in spite of "A Large Ratepayer's" tirade, the consumers certainly have the first claim to relief when the results are such as to justify it.

Slot Meter Robberies.

The intelligence has travelled to all parts of the country—through the agency of the purveyors to the public of sensational tit-bits—that last year there were no fewer than 5000 robberies from prepayment meters in the district of the South Metropolitan Gas Company. The information came to light in a case in which a youth was charged with stealing 3s. 1d. from a prepayment meter, and received as punishment for his crime a sentence of twenty-one days' hard labour. When discussing the relative merits of "stops" and "slots" about this time last year, we claimed as one of the minor advantages of the former the money being prepaid for gas directly into the hands of the collector; and as a disadvantage of the slot meter that, being the collector of the money, it was a standing temptation to any of predatory inclination, and to those suffering the miseries of extreme poverty. Sir George Livesey took up the cudgels on behalf of the slot meter; but he did not touch upon this point in his criticism. The statement as to there having been 5000 robberies in the past year in the South Metropolitan district is of a startling nature; and one can but regard it as an extremely grave matter. The slot meter has, the figures show, proved itself a potent instrument in the production of crime. The 5000 robberies represent, it may be taken, a considerable number of thieves; and one meditates over the point as to how many of those took their first step from the path of virtue owing to the presence of the tempting slot. There were no coin robberies before the days of slot meters, nor are there any where stop meters are used; for the simple reason that they do not offer the same temptation and opportunity for evil. Therefore the slot has introduced a new temptation to which, as seen, many succumb. How many other industries contain an instrument that is such a prolific source of wrong-doing? We do not know of another. It would be a matter of interest to learn from Sir George whether, during the last few years, these robberies show a percentage increase on the number of slot meters fixed. One cannot, of course, shed many sentimental tears over the alluring power for evil-doers of what is confessedly a highly useful means of trading between gas suppliers and the poorer inhabitants of their districts; but the opportunity for making the point in this matter of controversy cannot well be missed.

The Numerical Strength of the Ohio Association.

At various times during the past year or two, the proceedings of the Ohio Gaslight Association have been brought under the notice of our readers, mainly in connection with a feature which has hitherto been absent, but which will probably in the future be present, in the transactions of the Gas Associations on this side the Atlantic—viz., the "Question-Box," which, under the able control of Mr. Henry L. Doherty, is the vehicle for the dissemination of a mass of information of one kind and another. It is not to deal with this branch of the Association's work, which is being fully noticed elsewhere, that this paragraph has been written, but to call attention to the remarkable accession to the membership which took place at the last meeting, and to a possible still further accretion of its strength in the not distant future. It is probably not using exaggerated language to say that the addition of 340 members to the roll of a Gas Association at one stroke, which, as reported elsewhere, was a conspicuous feature of the "coming of age" meeting of the Ohio Association last month, is unique in the history of these organizations. Of course, the new members are not by any means all gas managers; but they are all, to use the words of the President, Mr. F. W. Stone, of Ashtabula (O.), "gas men"—that is to say, "men engaged in an occupation identifying them with the gas business." It will thus be seen that the constitution of the Ohio Association is broad enough—and the President said he was proud that it was so—to include anyone "qualified to assist in promoting the objects of the Association." Here, in England, we have for some years been exercised as to what to do with the class of men in question; and it has been decided to exclude them. The Ohio, however, is not an "Association of Gas Engineers and Managers," but a "Gas Association;" and the free admission into its ranks of practically all comers was justified by the President on the ground that all departments of the industry are so dependent one upon the other, that opportunity should be afforded for representative men in each to meet periodically to discuss questions affecting the interests of the entire body.

A Proposed Powerful American Gas Organization.

We have no intention of discussing the advisability of broadening the basis of a Gas Association in the way indicated above, but merely allude to it in connection with another project which, if carried out, will result in the constitution of a powerful organization. At the meeting of the Ohio Association, a suggestion was thrown out that steps should be taken to ascertain whether arrangements could be made for a joint meeting next year of the Ohio and Western Associations, with the view of giving effect to a growing disposition on the part of men who have been active workers in both to have them united. The matter is at present in the hands of a Committee of the first-named Association; and should the result of their labours lead to the proposal being recommended by the Executive Committee for approval, the matter will probably be settled next year. The result will be the production of a numerically strong body, and at the same time be the initial step in the direction of a combination of forces similar to that which has been effected by the affiliation movement in this country. The gas business is no second-rate one; and it will require united effort to keep it in the position it now occupies. The success of the Earl's Court Exhibition showed that this object could be achieved without a merging of what are regarded over here as distinct, though allied, interests. Across the Atlantic, however, such a union may be justified by existing conditions.

Old-Age Pensions.

A suggestion is once more being put forward for the provision of old-age pensions for all and sundry, in the shape of a Bill which has been presented by Mr. Channing, and supported,

among others, by Mr. Burns and Sir Albert Rollit. In the event of this measure becoming law, every British subject who fulfils certain conditions will, on attaining the age of sixty-five years, be entitled to a pension of five shillings a week. The conditions are not onerous—they are, indeed, no more than the most liberal minded would admit to be necessary to meet the case. In the first place, the recipient must be residing in the United Kingdom on the dates when he claims and when he establishes his claim to a pension; and he must have been living there continuously for not less than twenty years immediately preceding the date when he makes his claim. Occasional absences will not, however, constitute a disqualification unless the total period exceeds three years, and unless such absence shall have occurred during the five years immediately preceding the date of the claim. Seamen and other persons engaged on board vessels trading to and from this country will be entitled to a pension, if they prove that during their absence their family or place of residence was in the United Kingdom. In the second place, the pensioner must not within five years of claiming his pension have been guilty of such misconduct as would, if committed after the claim was established, cause the pension to be forfeited; such misconduct consisting of a crime (other than a political offence) for which he has been sentenced to penal servitude or any term of imprisonment exceeding twelve months with hard labour. A penalty is, of course, provided for such person as may by fraudulent means attempt to obtain a pension to which he is not entitled; and a further inducement to respectability is held out in the stipulation that if a pensioner is convicted of drunkenness, or of any offence punishable by imprisonment of not less than one month with hard labour, the Court may (in addition to any other penalty imposed) direct that the pension instalments shall not be paid for any period not exceeding two months, or that the instalments for such period shall be paid to or on behalf of any dependants of the pensioner. The pensions are to be paid as regards two-thirds of the total amount thereof in any year out of the Consolidated Fund of the United Kingdom, and as regards one-third out of the Exchequer Contribution Account of each county, which account shall be from time to time supplemented as may be necessary from the Local Taxation Fund. The amount of the pension cannot be termed extravagant for a man who has spent his life (as a useful member of the community) in hard and honest work. The drawback to such schemes is that, by treating all alike, they do not hold out any inducement to persons to do their best for themselves, their employers, and the country; and, more important still, they constitute a further step in the direction of shifting responsibility from the shoulders of individuals on to the State. There are many whose earnings are unfortunately so slender as to render the making of due provision for old age an impossibility; but there are more who might save if they chose, and who would find an additional incentive to thriftlessness in the knowledge that, so long as they remained in the United Kingdom and kept out of prison, a pension would be found for them on their reaching the age of sixty-five years without further effort of any kind whatever on their part.

Private Schemes.

The same objections cannot be held to apply to pension schemes formulated by private or public employers for the benefit of those who have laboured long in their service. Here the would-be recipient has every inducement to do his best throughout his working life. To secure his pension he must retain his position; and the amount of his allowance will depend upon his worth to his employer as indicated by the salary or wages received. Even the question of thrift is (at any rate partially) met by the argument that, inasmuch as the pension has to be thoroughly well earned, the very securing of it must be regarded as a form of thriftiness. As an instance of what may be done by capitalists in this direction, may be quoted the scheme lately formulated by Messrs. Lever Bros., of soap fame, who are arranging to set aside about £5000 a year for a fund that has been established for the benefit of their employees. The arrangement is set forth as follows: To every male employee who shall have completed at least fifteen years' service and shall retire after attaining the age of sixty-five years, and to every female employee who shall have completed at least fifteen years' service, and shall retire after attaining the age of fifty-five years, shall be paid a yearly amount equal to one-sixtieth part of his or her last year's salary or wages, multiplied by the number of complete years of employment with the Company, but not exceeding £300 a year. In the event of retirement at an earlier age through ill-health or injury, after at least fifteen years' service, a proportionate amount will be paid; and in case of death, after fifteen years' service, or on the death of a retired employee, allowances will be made to the widow and children. Where compensation is payable under the Employers' Liability or Workmen's Compensation Acts, the recipient or his dependants are not entitled to any allowance under the fund; but if the Trustees regard the compensation as inadequate, they have power to make a modified payment. This scheme Mr. W. H. Lever calls "Prosperity Sharing;" and he says it is not "pauperizing philanthropy," but "a reward for doing one's duty." For the reasons mentioned in the preceding remarks, such arrangements, where they can be carried into effect, appear preferable to pensions by Act of Parliament; but there are so many circumstances in which they are impossible, that it is to be feared they cannot be regarded as meeting the difficulty so far as the majority of wage-earners are concerned.

British Association of Water-Works Engineers.—We have received the volume of proceedings of this Association for the past year. It contains the address of the President (Mr. F. J. Bancroft, B.Sc., Assoc.M.Inst.C.E.), and the papers that were read at the two meetings held—the summer one at Hull, the winter one in London—with the discussions. These have already been dealt with in the "JOURNAL." A feature of special interest in the volume is the account of the excursion to Belgium which followed the summer meeting. In connection with this trip, visits were paid to the Antwerp and other water-works, accounts of which are furnished by Mr. Easton Devonshire, Assoc.M.Inst.C.E. The text of the papers is illustrated by diagrams inserted therein or by plates, of which there are seventeen. The useful subject-matter index has been extended by the inclusion of the contents of the volume, which has been produced under the editorship of Mr. Percy Griffith, M.Inst.C.E., F.G.S., and is published by Messrs. Biggs and Co., Salisbury Court, E.C.

The Use of Tar for Road Surfaces.—Tarring road surfaces made of flint and gravel to lay the dust during the summer, is stated by Mr. T. E. Ware, in a letter to the "Surveyor," to have been attended with considerable success. The tar is applied to a road which is dry and in good condition, and also more or less exposed to the sun and wind. All dust is removed, and ordinary gas tar in a boiling state is then well brushed into the surface—as thin a coat as possible being applied. An hour or two after the tar has been applied, fine sand, usually that first swept from the road, is added. This treatment, it is said, produces a dustless road that is practically noiseless and has a good surface for seven months in the year. Though the tarred surface is inclined to break up under wet and frosty weather, it does not become muddy, and after a few days of good weather settles back into a hard condition. If the traffic is continuous, the road has to be coated again in the spring, at a cost of about ¼d. per square yard.

Textbooks on Gas Manufacture and Management.—We have received from Messrs. John Allan and Co., Ludgate Circus, E.C., three little textbooks dealing with the manufacturing and official branches of the gas business. With regard to the former, "Mentor" has rendered further valuable help to students by giving them some lessons in construction in the third of his series of manuals written especially with the view to self-instruction. The form of question and answer adopted in the "Elementary" and the "Advanced" books, which have been already noticed, is not employed in this one; but the information is conveyed in such a manner as to be readily apprehended, and at the end are given papers containing answers to questions put to the candidates at the last examinations of the City and Guilds of London Institute. The book is intended chiefly for students who have not had the benefit of experience in the drawing office. A higher branch of constructional work is dealt with by Mr. G. P. Lewis, who has recently left the service of the Aldershot Gas and Water Company, in his book on "Modern Retort Settings: Their Construction and Working." It consists of nine chapters, the earlier of which are devoted to a consideration of the theoretical side of the question, while in the latter ones the author applies practically the principles laid down. In an appendix, he deals with the subject of "Specific Heat," and gives formulæ for calculating the British thermal units in gases having constant and variable heat-factors. The importance of the subject dealt with by Mr. Lewis is exemplified by the legal proceedings now in progress. The remaining book is entitled "Gas Accounts and Management;" the author being Mr. George Helps, of Nuneaton. In the course of twelve chapters, he lays down a complete system of book-keeping, offers useful remarks on matters connected with the commercial side of the gas manager's duties, and gives samples of the books, &c., to be used. The works under notice are reprints of a series of articles from the "Gas World."

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 251.)

LAST week was one of the quietest on the Stock Exchange. With the conclusion of the settlement the week before, and with the Easter holiday to follow, many members were absentees, and business was reduced to very low proportions. With this drawback, and with some little degree of nervousness regarding the movements of the Baltic fleet and its ultimate fate, things became rather dull, and prices were inclined to shrink. But the worst of the apprehension was over before the close; and at the end the tendency was decidedly more calm. In the Money Market, the situation was unchanged, and rates for short loans remained steady. The same may be said of discount. In the Gas Market, the volume of transactions was fairly large considering the holiday season and the quietude in other departments. Prices were remarkably steady, too, for only one change in quotation was effected. In Gaslight and Coke issues, the ordinary was fairly active, and was quite brisk on the closing day. The recorded figures were a shade easier, and ranged from 98 down to 96¾. Not much was done in the secured issues. The maximum changed hands at from 92 to 92⅜, one small parcel of preference was done at 111, and a bargain in the debenture at 90¼. South Metropolitan was little dealt in. The best price realized was 128¼; while the lowest was 127¼. The debenture was done once at 89½. Commercials were very quiet, with only one bargain in the 4 per cent. at 116¾, and two in the 3½ per cent. at 112 and 112½. The Suburban and Provincial were as usual very little dealt in. A parcel of British changed hands at 41¼. West Ham ordinary was marked at from 102⅜ to 103½, ditto preference at 124½ and 125, and ditto debenture at 108. Hardly anything was done in the Continental Companies. Imperial changed hands once at 220; but European and Union were not touched. Tuscan was done at 10 and 10⅛. Among the undertakings in the remoter world, Cape Town preference marked 10⅛, and Melbourne 5 per cent. bonds 101½. Primitiva ordinary marked 6 3/16 and 6¼, ditto preference 5⅛ and 5 3/16, and ditto debenture 97 and 97¼. Monte Video marked 12⅛, and River Plate from 13⅛ to 13⅜.

ELECTRIC LIGHTING MEMORANDA.

The Transfer of Municipal Electric Lighting Powers to Private Companies—The Brighton and Reading Accounts—Depreciation Neglect and Deficiency—Attempted Snaring of Traders.

AMONG the smaller of the municipalities who have cherished the hope of seeing the electric light illuminating their streets, municipal buildings, shops, and dwelling-houses, have been the Corporation of Sudbury. Years ago, when the question was in an inchoate state (in which condition it has been preserved by contrary circumstances), in commenting on the subject, we held Sudbury up as an example of a town in which the prospects of an undertaking being a success were suspect to the extreme. That the Local Government Board were of like opinion, has abundant declaration in the fact that, after the Council had obtained their Electric Lighting Order, the Board, exercising the discretion with which they are clothed, refused to grant them a loan for the purpose. The history of the electric light question in Sudbury is almost a pathetic one—execrable (municipally regarded) obstruction to the proud culmination of fondest desires having beset the Corporation at every single turn. On the Local Government Board declining to be parties to the Corporation scheme for burdening the ratepayers, the latter attempted what has been judicially determined to be a flagrant evasion of the Electric Lighting Act of 1882, by entering into an agreement which would have conferred upon the Empire Electric Light Company, Limited, all the powers possessed by the Corporation under their Order. This is denied by the Corporation and their advisers. But the agreement has to be read in its entirety; and, having read it, Mr. Justice Warrington has different views on the matter. The Board of Trade were duly apprised of the negotiations and agreement with the Company, with the object of obtaining the consent of the central authority to what was, to all intents and purposes—the agreement appears to be very clear, whatever the original intention may have been—a transfer of the statutory powers of the Corporation. The statement of the Board of Trade that they had no authority to grant their consent was interpreted by the Corporation to mean that the agreement could be completed without their sanction. The Company, on the other hand, very properly declined to proceed with it in the absence of consent by the Board. Thereupon, the Corporation entered a claim against the Company for the payment of a sum of £2000 to which they were to be liable in the event of default; and this action has brought from Mr. Justice Warrington a decision which may have a useful effect upon authorities who encourage the idea that they have it within their power to treat a parliamentary enactment as nothing better than a piece of waste paper.

The General Act dealing with the matter very explicitly states that a local authority may contract with a company for the execution and maintenance of any works needed for the purpose of an electric supply, or for the supply of electric light; but no local authority, company, or person shall (it is specifically laid down), by any contract or assignment, transfer to any company or person, or divest themselves of any legal powers given to them, or any legal liabilities imposed on them, by the Act. There seems to be no ambiguity about the meaning of this. But Solicitors for the Corporation and for the Company, together with Mr. Hawtayne, the Consulting Engineer, apparently came to the conclusion that the Legislature did not mean what they said; or, if they did not think this, then they did not completely understand the import of the agreement to which they were parties. We can do little more here than state the facts of the case, inasmuch as the Corporation are contemplating taking Counsel's opinion so as to ascertain whether a little more litigation stands a fair chance of setting aside Mr. Justice Warrington's judgment, which, in deliberate phrase, went altogether against the Corporation, who were also condemned in costs. They are in muddle enough as it is; and they will be well-advised to stop their infatuated struggle for the electric light. It will be financially better for the ratepayers in the end, as the Corporation will see if they will only study the recent exposures as to costs of public lighting by electricity. They have already spent a lot of money over the scheme—and all with no result. They now owe to Mr. Hawtayne (who seems to be the man who has profited most over this business) somewhere about £770; there are the costs in this action; and, if the appeal is persisted in, the Corporation stand a good chance of finding another load of costs on their shoulders. What have they got for all this? A very awkward thing is that no one is clear as to where the money is coming from to foot the heavy accounts entered against the Corporation. The bigwigs of other little struggling country towns should take warning.

It is quite a prevailing fashion in the Press to criticize the accounts of municipal electricity supply undertakings, since municipal finance has fallen, as it has, into such great disgrace. The "Financier" has lately dropped heavily on the general finances of Brighton. Why Brighton was chosen more than any other place is not explained; but it is a lugubrious example of municipal profusion and carelessness. Financially, the "Queen of Watering-Places" is indeed under a very dark cloud; and sneer and derision meet the corporate incapables on every hand. Blessed is the electricity undertaking; for it at all events can be made by a convenient evasion of sound finance, to show a net profit of £6959; and this allows the indulgence of a little gratification in the form of applying £3250 "in aid of the district rate." But the "Financier" rates the Municipality roundly for their total omission to deal with the question of depreciation; and by calculating "only 5 per cent. on the capital of £500,000," equalling £25,000, our contemporary shows that the picture is not such a cheerful one as the Council would have the ratepayers believe. The neglect, however, is a common one with electricity undertakings—both local authority and company—whose plant is of an order that, with a busy life, has a comparatively short career. Take, as an instance, of a provincial company, the Reading concern. Their capital account is accumulating fast. Last year they expended £11,981; and the issued capital totalled to £120,000. The profit-balance on the year's working is only £7461; and how close they have to cut to the knuckle to pay a 5 per cent. dividend, is seen from the fact that they have only a balance of £40 to carry forward. It is true that they write off £800 of "preliminary" expenses (the Company started business eleven years ago), and carry the very inadequate sum of £700 to the credit of the reserve fund, which is all that they can boast under this heading. Looking at the revenue account, it is seen, too, that £2100 is the sum allocated on the year to depreciation. Calculating only 5 per cent. (as applied by the "Financier" to Brighton) on the £120,000, we have £6000 as the sum that should at least represent depreciation on such plant. If the Company had made this provision, the shareholders would have had to whistle for a dividend. Therefore, the accounts do not present the Company in that sound and safe position that the shareholders could wish. The Company, as intimated, have been in existence since 1894; and their rate of increase in new connections last year was the lowest they have had for some years past. Besides this, the Company are about to issue 4800 £5 shares, upon which payment of £4 each is immediately required. There will have to be a big increase in business to meet the accruing liabilities; and the Company have got their work cut out to get it. Even during the last few months, they have lost certain business premises, through the economic and other advantages of incandescent gas-burners. The Company are trying the effect of an electrical exhibition this week, to gain admission to which non-ticket holders must be provided with a sixpence! We suppose this is one of the itinerant electrical shows whose mission is of the "revival" order.

Our respects to the traders of Smethwick. The Tramway Company (whose initials B.E.T. are significant of power and of all the stratagem for securing electrical and tramway business that brains could possibly evolve) are prepared to supply the shopkeepers with light; but those trading in the borough who are members of the Traders' Association are cautious, and refuse to be wheedled over until they have thoroughly inquired into the matter of whether the Company can offer them better value for their money than their present system of artificial lighting. As the traders have not from the outset shown any disposition to even nibble, the Company lately sent down two of their most eloquent and suasive ambassadors to meet the traders, in order to assure them that the Company are offering something remarkably

fine, at a cost more modest than anything they at present possess, and that the only way to increase business nowadays is to keep "ahead" of the times, which means that no one is "ahead" of the times if he does not patronize electricity. What is the good of wasting time and space in criticizing such thin seductive nonsense as this; and we are glad to see that the traders of Smethwick are sagacious enough to see that the stock palaver of these "knights of commerce" of the B.E.T. Company must be taken with a big pinch of salt. Comparative figures (say one of these men), put forward by the advocates of gas are not always reliable. The qualification is accepted by us; and the statement is appropriated in its entirety for application to those laid before the Smethwick audience. To assert that experience confirms that 1000 cubic feet of gas are equal in practical lighting work to only 7 units of electricity, is not only unreliable, but it is untrue, as the succeeding statement will show. "A Board of Trade unit," said the speaker, "would supply one 8-candle power lamp for thirty hours, or 30 such lamps for one hour; and the cost of thirty 8-candle lamps burning regularly for three hours per day would, at the rate charged by the Company, amount to only 4·1d. per unit." Rather artful not to add that, in this case, the 4·1d. must be multiplied by the three hours. Now in Smethwick 100 cubic feet of gas would cost between 3d. and 3½d.; and 100 cubic feet of gas would supply 30 incandescent gas-burners for an hour, each giving a light of (say) 50 candles. In other words, with the incandescent gas-light, there would be obtained a total illuminating power of 50 × 30 = 1500 candles, for 3d. to 3½d., per hour, as against 8 × 30 = 240 candles for electricity at 4·1d. per unit. Where is the foundation now for the statement that 1000 cubic feet of gas are only equal "in practical lighting work" to 7 units of electricity? It is unnecessary to consider the further reliability of the statements after this piece of inaccuracy on the part of the electrical advocate. All his audacity and eloquence did not succeed in convincing the business men of Smethwick that they require educating by the B.E.T. in the art of obtaining good value for money expended.

NOTES FROM WESTMINSTER.

THERE are only one or two matters referring to proceedings in the Committee Rooms which must be mentioned in order to complete our chronicle up to the Easter vacation.

Bolton Water. In connection with the Bolton Bill (in which large powers affecting the Corporation water-works are included), after a considerable amount of discussion subsequent to our last notice, the Committee announced that they were prepared to find the preamble proved, on condition that the promoters made an offer to Darwen by which the Corporation of the town can obtain 300,000 gallons of water a day, on terms which the Committee consider reasonable. For this purpose, the proceedings stand adjourned until the 8th of May. The decision has caused much surprise in Bolton; and speculation is rife as to the course the Corporation will take in the circumstances.

On the Proper Shoulders. A matter which is of interest to ratepayers generally arose on the Heckmondwike District Council Bill; and the Police and Sanitary Committee came to a very sensible decision over it. Part of the Bill has reference to the disposal of trade refuse. Of course, in principle it may be contended that provision in this respect benefits both the manufacturers and the ratepayers; but, in reality, it is more to the advantage of the manufacturers. It therefore seems hardly fair that any expense to which the local authority may be put in providing means for relieving the manufacturers of their refuse should be charged upon the whole of the community. The Committee were of this opinion; and they passed the clauses in question on the understanding that the expenses should fall upon the manufacturers. We should like to see the principle extended; and then there would be less local favouritism. The provision of electric lighting should always be subject to the same rule; and therefore the Northumberland clause which envelops a somewhat similar principle should be sought on all available occasions.

Admonition. One other point about the Heckmondwike Bill. When it was introduced, its contents were represented by 241 clauses; as the measure left the Committee, there were 109 surviving clauses—the difference being mostly due to withdrawals by the promoters. Such action called forth a strong remonstrance from the Chairman (Mr. J. W. Wilson), who resented very keenly the manner in which the Bill had been presented to the Committee. This is not surprising. The withdrawal of so many clauses really left a Bill which was in no sense the same as the one that had originally been deposited. The Council would have been better advised to decide what clauses they wanted, and what purposes they needed them for, than to have left a Bill to be compacted from such a mass of material, causing great waste of time, and an amount of unnecessary expense which will be a serious thing for a town like Heckmondwike. The muddles created by local authorities are growing; and they will be well advised to take a hint from the admonition received by this District Council from the Chairman of the Police and Sanitary Committee.

A PEEP INTO THE QUESTION-BOX.

CONCLUDING ARTICLE.

WHEN we come to the section of the volume of which "Residuals" forms the subject-matter, we find wide breaches of opinion on the question as to whether a gas company should handle their own residual products or should contract them to others. Between affirmative and negative views there is perhaps about an equality in point of number. But, on the whole, it is conceded that it is much a question of circumstance; and if that is favourable, it is better for a gas company to deal with their own products. About this, there is, generally speaking, no question in this country. Still there are exceptions to the rule; and exceptions are pointed to in the replies of some of the contributors. The pooling of the residuals in the cases of small undertakings is advocated by some. "A general arrangement of this sort would," says one correspondent, "do away with the arbitrary dictation of present residual buyers as to values, and would, without doubt, result in reduced net cost of the gas produced." It is noticed that British correspondents have interested themselves in this question; and the definite statement contained in the reply of Mr. J. Ballantyne, of Hamilton, induces us to quote from him. "A gas company," he remarks, "should handle their own bye-products, if their annual make of gas exceeds 25 to 30 million cubic feet. Until three years ago, we sold all our residuals to an outside contractor. But since that date, we have been using our ammoniacal liquor for the production of sulphate of ammonia; and each year there has been a large profit—after allowing for all working expenses, including acid, wages, upkeep, fuel, interest and sinking fund, and also value of liquor had it been sold—of about £1500 per annum on a yearly make of gas of 150 million cubic feet. We intend shortly dealing with our tar, as I am certain there will be also a profit obtained from it."

It is found that there is quite a general opinion among the American gas engineers that the best place for water-gas tar is under boilers, and there, consequently, is found its most profitable utilization. But in respect of coal tar, there is only one answer, which answer assures us that, under American conditions, the most profitable outlets for its sale are the laying of tar walks, for roofing, and for tar street paving. The question of cyanide production is engaging attention on the other side; and in the answers the formulæ quoted have a remarkable family resemblance—naturally; and reading down the contributions, it is seen that the information could easily have been condensed into a third of the space. Dr. H. G. Colman is one of the contributors, and concisely gives what is practically a summary of the answers submitted by the remaining writers. It is, however, already available information. There is, a few pages on, a formidable looking question, which puts a poser. It is asked why would it not be practicable for each of the 800 gas companies in the United States to contribute (say) $25 annually, toward the support of a gas engineering laboratory, to determine how best to work up the gas tar output of the country; and thereby cut off the enormous tar product imports, as shown by the latest Government reports? It appears the Government spend $15,000 annually in each of the fifty States for agricultural experimental stations. Why could not, it is further asked, a part of this three-quarters of a million dollars ($750,000) be used on tar-product investigations, and some of the work be done at the present stations? Echo only answers—Why? There are two replies—the first being contributed by Mr. Frederic Egner, from whom we learn that an attempt was made in 1884 to interest gas companies generally, to form an alliance; but for lack of appreciation, the project came to nothing. It may be, however, while earlier attempts failed to get the companies together, that enough of them might now be interested to do something of value, even though the whole 800 cannot be secured. It is stated in the second reply that the value of tar produced in the United States is $2,200,000, and the value of the tar products imported is $9,400,000, which is estimated to be worth in the wholesale markets at least $12,000,000. What makes this difference in value? Labour largely; and it is thought that here there is a question well worthy a most thorough and careful investigation. There is a succeeding question which bears on the one here referred to; and it is, What are the values of the products of tar distillation? There is an answer to it which we will take in its entirety. It says for the year June 30, 1903, the free-on-dock values of tar products imported into America were—

Name of Product.	Foreign Value.	Duty.	Value on Dock.	Percentage Value.
Salicylic acid . . .	$19,012 ..	$7,827 ..	$26,839 ..	0·3
Alizarine and colours or dyes, natural and artificial	660,464 ..	Free ..	660,464 ..	7·3
Analine salts . . .	789,553 ..	Free ..	789,553 ..	8·3
Coal tar colours or dyes not especially provided for. . .	5,252,611 ..	1,575,783 ..	6,828,394 ..	72·7
Coal tar, all preparations not colours or dyes	544,176 ..	108,835 ..	653,011 ..	7·0
Benzol, toluol, &c. .	425,069 ..	Free ..	425,069 ..	4·4
Total . . .	$7,690,885 ..	$1,692,445 .	$9,383,330 ..	100·0

To these values must be added freight, handling, profits, &c.

The section of "Manufacturing Chemistry and Physics" is a

solid one, and contains indications of a vigilant study of, and research into, the literature bearing upon the various questions. We truly wish that naphthalene had been confined to one section, as, so far, almost everyone has contained references to it; and when here, in section 5, the inquiry is found, What is the best fluid to be used for washing out naphthalene? one feels that the replies could have found convenient shelter under an earlier inquiry. Altogether there are a dozen different questions scattered through the book bearing upon the bugbear of the gas manager; and it would certainly have been of advantage if they had been properly assembled. Moving on, there is next a short section devoted to "Storage;" and some four pages are taken up with replies which show there is no settled opinion on the point as to which is the best holder paint. Red lead, graphite, oxide of iron, or black varnish prepared from coal tar, are variously favoured. One correspondent writes at length on the foundation coat as a great factor in increasing or decreasing the durability of the succeeding coats. The majority of holders are still being first-coated with red lead, for no special reason that the writer knows of, notwithstanding the fact that there is no pigment used by the paint trade that has a stronger affinity for, or is as destructively affected by, sulphur and ammonia, as red lead. Therefore when used in places where such gases exist, it must be quickly covered by protective coatings of an oxide paint, or its durability and value as a foundation coat will be sadly impaired. It is conceded that, if properly mixed, properly applied, and quickly covered by a protective coating, red lead will give a durable first-coating; but these conditions do not exist in the building of a new holder, as usually many months must elapse before the finishing coats are put on. Better results, it is claimed, can be obtained by first-coating with a pure carbon black, or a paint made with blue lead, than can possibly be obtained by the use of red lead. This is stated as the result of actual tests covering above 75 per cent. of the holders in the United States. Remedies for the freezing of water in holder tanks and cups consume much space; and steam applied in a variety of manners is the approved plan. Salt is vigorously condemned on account of its destructive influence.

To distribution, supplies, materials, and operation, there has been quite an enthusiastic contribution; the matter running over close upon 100 pages. It is noticed that there is a diversity of opinion as to the fixing of prepayment meters in boarding houses and hotels for the use of visitors; but there is experience both ways as to success and otherwise. There seems to be some fear of accident, on the exhaustion of the paid-for gas, should there be a renewal of the supply by the insertion of a coin without all the taps being turned off, or the burners ignited. This is regarded as a great objection to their use in boarding-houses or hotels. The experience in the general use of prepayment meters in this country under ordinary conditions does not support the idea of this being a serious peril. In "distribution operation," we come across what is at the moment a very interesting inquiry, with no less interesting replies so far as they represent American opinion and practice. It is asked, What is the proper candle power of gas for gas-range use, and at what pressure should it be delivered at the stove? The answers from American contributors take in illuminating powers between 15 and 25 candles, with pressures varying (say) between 2 and 3 inches. But there is one writer who asserts that with water gas he finds that a lower illuminating power than 20 candles causes trouble; while with coal gas 4 candles is satisfactory, if the pressure is not too low. Another correspondent favours 15 candles for coal gas and 18 candles for water gas; while another pins himself to 16 candles for coal gas and 22 candles for water gas.

We must now bring to a close this examination of the Ohio Question-Box for 1905. There are several parts that have been left altogether without notice; but it is impossible for us to look into them all. The sections upon which we have not touched are "Chemistry and Physics (other than Manufacturing)," "Gas-Engines," "Gas-Burning Appliances," "New Business Methods," "Collections and Dealings with Consumers," "Accounting," "Management," "Legal Matters," "Literature," and "Miscellaneous." In the course of the review, there has been a certain amount of criticism of the volume; but Mr. Doherty and his colleagues will recognize that it is friendly, and intended to be suggestive rather than destructive—encouraging to modification of operation rather than dispiriting. It is our opinion that improvement is possible; and that the utmost usefulness of the work will not be attained before questions and answers go through the refining process. Until that has taken place, there is waste of money which could be more profitably expended upon attaining the ultimate and more valuable result. It is quality and accuracy not the gross quantity that tells in a work of this kind; and it is no use spoiling the result by attempting too much.

A gas-engine railway power plant has been built at Garrett's Run (Pa.) for the Kittanning and Leechburg Railway Company. It is housed in a brick building, 45 feet by 95 feet in plan and 18 feet in clear height to the roof trusses, and is designed to contain four 500-horse power gas-engines. The type of gas-engine installed is the three-cylinder vertical engine built by the Struthers-Wells Company of Warren (Pa.), with direct-connected 250 kilowatt generator. In the centre of the building, in the basement, is a 20-horse power gas-engine, which furnishes power for the air-compressors and water pump.

OUR COAL RESOURCES AND CONSUMPTION.

It is now somewhere about five years since the question of the coal resources of this country, and their probable duration—always an interesting one—came anew into prominence in the public mind, owing to a period of abnormal industrial activity at home and abroad coinciding with a check in the output of coal caused by labour troubles in Wales. The winter of 1899-1900 will not readily be forgotten by most gas managers, many of whom had a very anxious time, owing to depleted or exhausted coal stocks; while the consequent temporary increase in the price of gas in most districts was for the time a serious hindrance to the expansion of the gas industry, the effects of which have scarcely yet died away.

The interest which was aroused in the public mind by the scarcity and dearness of coal, and the rise in the price of its products, was increased by the ignorant vapourings of that section of the Press which seizes every occasion to make sensational statements, quite heedless of whether they have any sound foundation in fact. It was sufficient for the "experts" who furnish such papers with copy that (1) there was a shortage of coal, and (2) that Professor Jevons had predicted the exhaustion of our coalfields in 100 years from 1861, to assert that "the coal famine predicted by Jevons" had "arrived." We were at considerable pains to prove conclusively to the readers of the "Journal" (who have a vital interest in the matter of our coal supply) that "the approaching exhaustion of our coalfields" had no more to do with the temporary tightness of the coal market than the man in the moon; but as the Daily Press have no time to investigate matters of public interest, if the investigation involves anything more than two or three interviews and a few more or less interesting photographs, the public alarm had to be soothed by the usual prescription—a Royal Commission of Inquiry.

There were, however, good reasons why those who fully understood the causes of the "coal famine" of 1899-1901 welcomed the appointment of a Commission on the Coal Question. Thirty years had elapsed since the Argyll Commission of 1866-71 published the results of their investigations; and the exports of coal from this country had increased so astonishingly in that period, that it was generally felt that an official reconsideration of the estimates, drawn up in 1871, of our coal resources and their probable duration, was desirable. From the material at our disposal, we attempted a reconsideration of those estimates early in the history of the coal shortage; and in the course of the articles embodying the result of such reconsideration (published in the "Journal" for Feb. 20 and 27, 1900), we suggested, first, that a Committee of Experts should be appointed to revise the estimates of our coal supply, and, second, that a new edition of the famous work of Professor Edward Hull—on which Jevons based his pessimistic (and time-falsified) forecast—would be welcome to all interested in the problem.

The Royal Commission on Coal Supplies has come and gone; and now, as the final fruit of the troubles of five years ago, comes the revised (and fifth) edition of Professor Hull's "classic"—"The Coalfields of Great Britain,"* of which the first edition was published in 1861, to supply the want of reliable information which the parliamentary debates on the Commercial Treaty with France in 1860 had revealed. This latest edition embodies the results arrived at by the Commission of 1904, so far as they relate to the subject-matter of the book itself. It does not profess to be a report of the entire work done by the Commissioners (of whom Professor Hull was one); that is contained in voluminous Blue Books, reference to which is always a laborious task. A work, such as Professor Hull's, which gives the essence of the Commissioners' work without the overwhelming details, is, therefore, most welcome, particularly as it contains all those interesting and important data relating to the various coalfields of this country which have constituted the main features of former editions. The only pity is that the additional matter has been inserted in a piecemeal fashion and in such a way that the book has, in the course of its various revisions, become somewhat disjointed, and calls for recasting in certain portions.

A brief consideration of the main conclusions of the Commission of 1904, and a statement of the prospects in regard to the duration of our coal supply—as compared with the forecasts of Jevons and of the Argyll Commission—may not be considered out of place in this article, which savours of a farewell discussion of the question that was so urgently brought to the notice of the gas industry a few years ago, and which will now slumber until the next "boom" in trade causes another temporary shortness of the coal supply in Great Britain.

In 1861, Professor Hull estimated that the total known coal resources of this country (at a depth not exceeding 4000 feet—the limit of practical working as agreed by all the experts who have considered the point) at 83,000 million tons. No calculation or allowance was made by him in respect of coal in the concealed beds underlying the Permian, Triassic, and Liassic strata. The output in the succeeding eight years amounted to 757 million tons; leaving an estimated "stock" at the end of 1869 of 82,243 millions. The 1871 Commission, however, were able to increase this estimate to 90,207 millions, and in addition calculated

*The Coalfields of Great Britain: Their History, Structure, and Resources. By Edward Hull, M.A., LL.D. Hugh Rees, Limited, London.

that there were some 56,273 million tons in concealed coal beds at depths not exceeding 4000 feet—making a total practically obtainable stock of 146,480 million tons. In the 34 years, 1870 to 1903 inclusive, the quantity of coal raised was 5695 million tons, which, deducted from the 1871 Commissioners' estimate, would have left an estimated stock at the end of 1903 of 140,785 millions. The corresponding estimate of the 1904 Commissioners was 140,352 million tons;* so no amendment worthy of the name is required in respect of the estimates made 33 years ago—a very satisfactory conclusion. The only difference between the two Commissions' estimates is that the later report increases the proportion of coal in the known and decreases that in the unknown coalfields, which is only what might have been anticipated, having in view the fuller and more accurate geological knowledge obtained during the intervening third of a century.

Deducting last year's output, our available coal resources may, therefore, be put (in round figures) at 140,000 million tons, or over 600 years' consumption at the present rate of output. As, however, the average increase in output during the past 33 years has been 3·63 million tons, it is obvious that any calculation based on the present output is bound to be very wide of the mark. Estimating an arbitrary constant increase of 3 million tons per annum, the 140,000 millions mentioned would last us not quite 240 years from the present time. There can be, of course, no question of our output increasing from 230 to 950 millions a year and then suddenly coming to a stop. The increasing cost of mining, as the more easily worked seams are exhausted, and the decreasing rate of increase in population as the country becomes more densely peopled, will combine to check gradually the increase in the output of coal. It would, therefore, we think, be well within the probabilities if we said there is every reason to believe that we shall have ample supplies of cheap coal for at least another 100 years to come, and that the coalfields of this country will not approach exhaustion within the next 250 years.

With this comforting assurance we may well conclude our notice of Professor Hull's interesting and valuable book, which should find a place on the bookshelf of every gas manager who strives after the description of being "well informed."

* In future editions, it would be well if the figures on pages 281 and 433 were made to agree. At present they differ by 498 million tons.

Job Lots of Mantles for England.

In the "JOURNAL" a fortnight ago, we animadverted rather strongly upon the practice of certain individuals or firms, as revealed by an advertisement in a German contemporary, of purchasing "wasters" and job lots of second-rate gas-mantles on the Continent, and disposing of them in this country. It appears, from a letter received from a correspondent, that a considerable business is done in these goods in England among hawkers, and in some cases even good-class shop-keepers. As a fairly large dealer in incandescent gas goods since 1894, he knows for a fact that there are merchants here who pay periodical visits to the Continent with the object of placing contracts for these second-quality mantles, &c., and job lines generally; and he assures us that, at times, some very good bargains are to be had. Of course, it does not by any means follow that all the lines bought under these conditions are rubbish. A man on the spot, having in his possession the necessary ready money, can very often strike a good bargain, with certain makers, especially during the summer months. Our correspondent is acquainted with merchants who find these journeys, which combine pleasure with business, most profitable; and he says that "while there is the supply there will be a demand, and so long as there is a demand there will be a supply," even if the goods have to be made to order. He maintains that the remedy for the existing state of things lies with the makers, both in England and abroad. He acknowledges that these seconds mantles do the trade generally a great deal of harm—this, indeed, was our view in calling attention to the advertisement—and are the cause of a good many frauds; and he thinks the proper course for the makers to follow would be to boil the mantles up again, and not allow them to get upon the market. Our correspondent's view is that the sooner makers decide on being satisfied with the mantle ash, instead of putting a second-class article upon the market, to be, in many cases, pushed off for the sound one, the better it will be for all concerned. We quite agree with him. It may be pointed out that we were not singular in condemning the practice revealed by the advertisement. The writer of the notes over the signature "Vulcan," in our contemporary the "Ironmonger," called attention to it in the number for the 15th inst. He remarked that, whatever opinion might be held as to the advisability of our lying low and saying nothing when goods of satisfactory quality are dumped into this country, when it was treated as a place where "wasters" might be shot with impunity, it was time to utter a mild protest. Unfortunately, some of our contemporary's subscribers show, says "Vulcan," an "unhealthy hankering" after this rubbish. He emphasizes the point that with mantles, as with most other classes of goods, the best are the cheapest; and he thinks that "no ironmonger should risk damaging his reputation by dealing in articles which our thrifty cousins German are too wide-awake to touch."

PERSONAL.

Mr. J. E. BUCKLE, who was for some years Manager of the Woodbridge Gas-Works, has just obtained an appointment as Carbonizing Manager at the works of the Shotley Bridge and Consett Gas Company.

Mr. JAMES ANDERSON has been appointed a Director of the Monte Video Water-Works Company and of the Consolidated Water-Works Company of Rosario, in place of the late Mr. John Morris, whose death was noticed in the "JOURNAL" for the 28th ult.

The official list of honours of the Chartered Institute of Secretaries of Joint-Stock Companies contains the name of Mr. WILLIAM JOHNSTON, the Secretary of the Coatbridge Gas Company, who has qualified as a fellow of the Institute; and the Council have conferred on him the degree of F.C.I.S., which is the highest their Charter empowers them to award.

OBITUARY.

The death is announced of Mr. F. V. HILL, one of the Directors of the Helston and Porthleven Water Company. The deceased gentleman was Mayor of Helston on no less than eleven occasions, and as many as three times in succession. He was 73 years old.

Mr. JAMES WILSON, solicitor and banker in Falkirk, Town Clerk of the burgh from 1883 to 1899, died in Edinburgh on Tuesday of last week. Mr. Wilson was Town Clerk when the gas transfer was carried through, and was the first Clerk to the Gas Commissioners. He has been in feeble health since retiring in 1899.

The Harrogate Gas Company have sustained a severe loss by the death of Mr. JOHN BARBER, J.P., who had been a Director for no less than 22 years. Mr. Barber, who was over eighty years of age, was for a long period connected with public affairs in Harrogate; having been for a quarter-of-a-century a member of the old Board of Improvement Commissioners, and at one time Chairman. He was one of the founders of the Harrogate Market, and also did a great deal of good work as Chairman of the Board of Guardians. At the funeral, which took place last Tuesday, the Gas Company were represented by Mr. S. Hornby (Chairman), Messrs. J. D. Hannam, C. Greenwood, and S. Spencer (Directors), Mr. H. Wilkinson (Secretary), and Mr. G. Sayner (Works Manager). Following in the procession were a number of employees of the Company, including the Chief Clerk (Mr. Leithead), Outdoor Superintendent (Mr. W. Deighton), Engineer's-Assistant (Mr. Jackman), Works Superintendent (Mr. G. Deighton), Carbonizing Foreman (Mr. Satterthwaite), and several men representing their fellow-workmen, who always held Mr. Barber in high esteem, and regarded him as their friend.

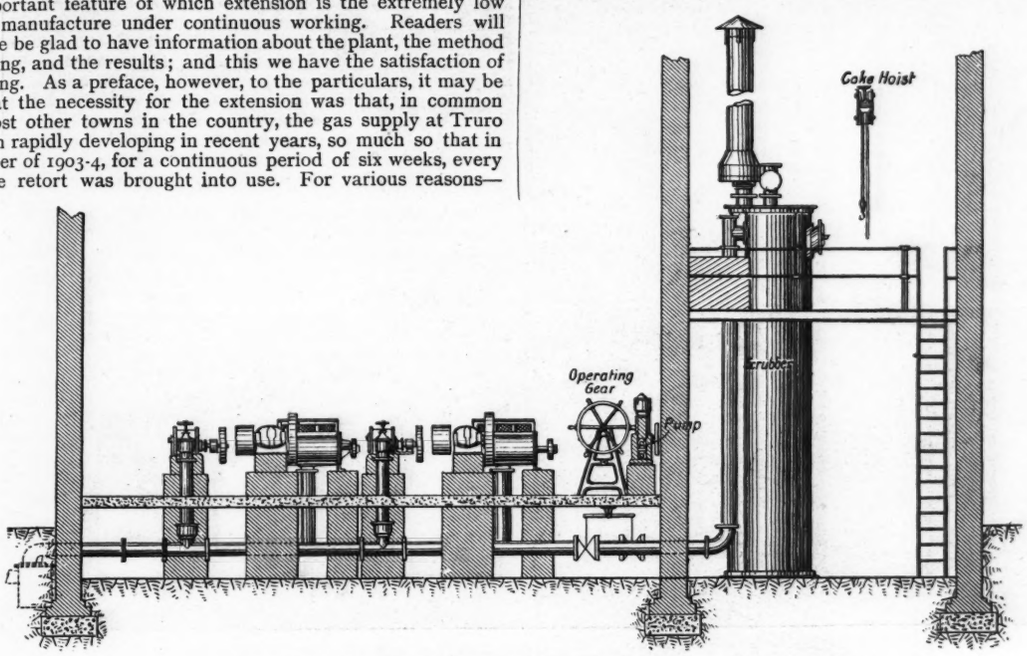
Presentation to Mr. L. J. Blackburn.

It has already been mentioned that Mr. L. J. Blackburn, Assistant to Mr. S. O. Stephenson at the Tipton Gas-Works, has obtained the appointment of Manager of the Kowloon station of the Hong Kong and China Gas Company. A few days ago he was presented with a case of instruments, subscribed for by the officials and staff, as a mark of their respect for him. Mr. Stephenson, in the course of a few opening remarks, said he felt that Mr. Blackburn had obtained a good start in life, and he believed he would do very well. They would all feel gratified if he succeeded, and they thought there was no doubt as to his doing so. The presentation was made by Mr. J. Powell, the Chairman of the Gas Committee, who congratulated Mr. Blackburn on getting his appointment. As he had received his professional training solely at Tipton, his success, in a competition in which sixty were engaged, was a distinct honour to the officials and men at the gas-works. They were going to present him with a case of instruments, which he thought a most commendable course, as they were equipping him with the means of keeping up a high standard and trying to help him in his work. They hoped he would retain the credit he had already received from the Directors of the Company he was going to serve, and the respect he had from those present and from the officials at Tipton. They would ask him to go further, and win the confidence of those Directors, so that they would bless the day they had secured a trained man from Tipton. Mr. Blackburn, in responding, expressed his thanks for the most useful gifts they had seen fit to offer him, and said that every time he had occasion to use them he should remember with gratification the kindness shown to him while he had been at Tipton. He thanked Mr. Stephenson and the men most heartily for the way they had helped him.

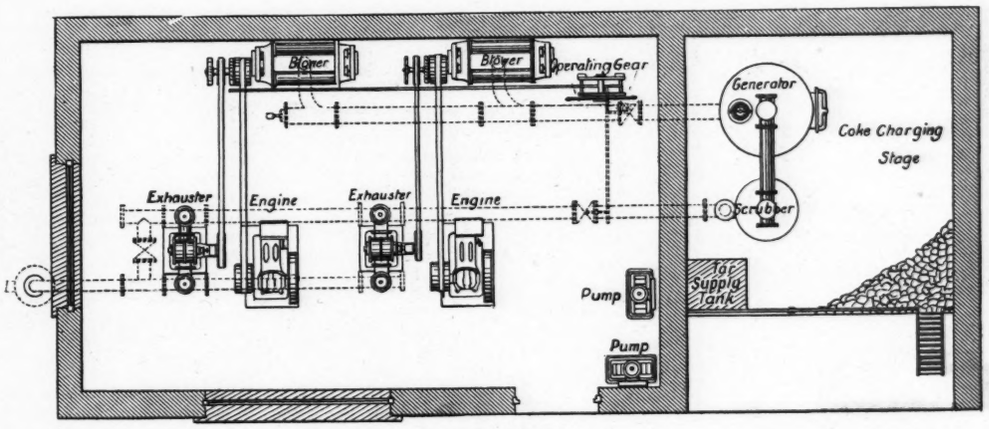
Gas Managers as Municipal Councillors.—In connection with this matter (which has been referred to in the last two issues of the "JOURNAL"), we are pleased to be able to record the unanimous election of Mr. Henry Tobey, the esteemed Engineer and Secretary of the Malton Gas Company, as Chairman of the Malton Urban District Council. The gentleman who proposed him pointed out that Mr. Tobey had been a member of the Council ever since it was a Council; and he was well conversant with the affairs of the town.

THE METHANE-HYDROGEN GAS PLANT AT TRURO.

It has been generally known that a methane-hydrogen plant has been in process of installation at the Truro Gas-Works. The plant has now been completed a sufficient length of time for tests of an adequate character being made, and for the final acceptance by the Company of the apparatus from the Contractors. In view of this, there is to be to-morrow a formal inauguration of this interesting extension of the producing capacity of the works, one important feature of which extension is the extremely low cost of manufacture under continuous working. Readers will therefore be glad to have information about the plant, the method of working, and the results; and this we have the satisfaction of presenting. As a preface, however, to the particulars, it may be said that the necessity for the extension was that, in common with most other towns in the country, the gas supply at Truro has been rapidly developing in recent years, so much so that in the winter of 1903-4, for a continuous period of six weeks, every available retort was brought into use. For various reasons—



Sectional Elevation of the Methane-Hydrogen Plant.



Plan of Above.

principally the difficulties of the site—it was found to be undesirable to extend the retort-house; and consideration was given to the various types of water-gas plants. But eventually, as will have already been gathered, on the advice of the Company's Engineer (Mr. S. J. Ingram) it was decided to accept the tender of Messrs. Biggs, Wall, and Co., of London, for an installation of methane-hydrogen gas plant. The plant was erected, under a very stringent guarantee, to produce 150,000 cubic feet of methane-hydrogen gas per 24 hours; but in actual working it is capable of producing more than 200,000 feet.

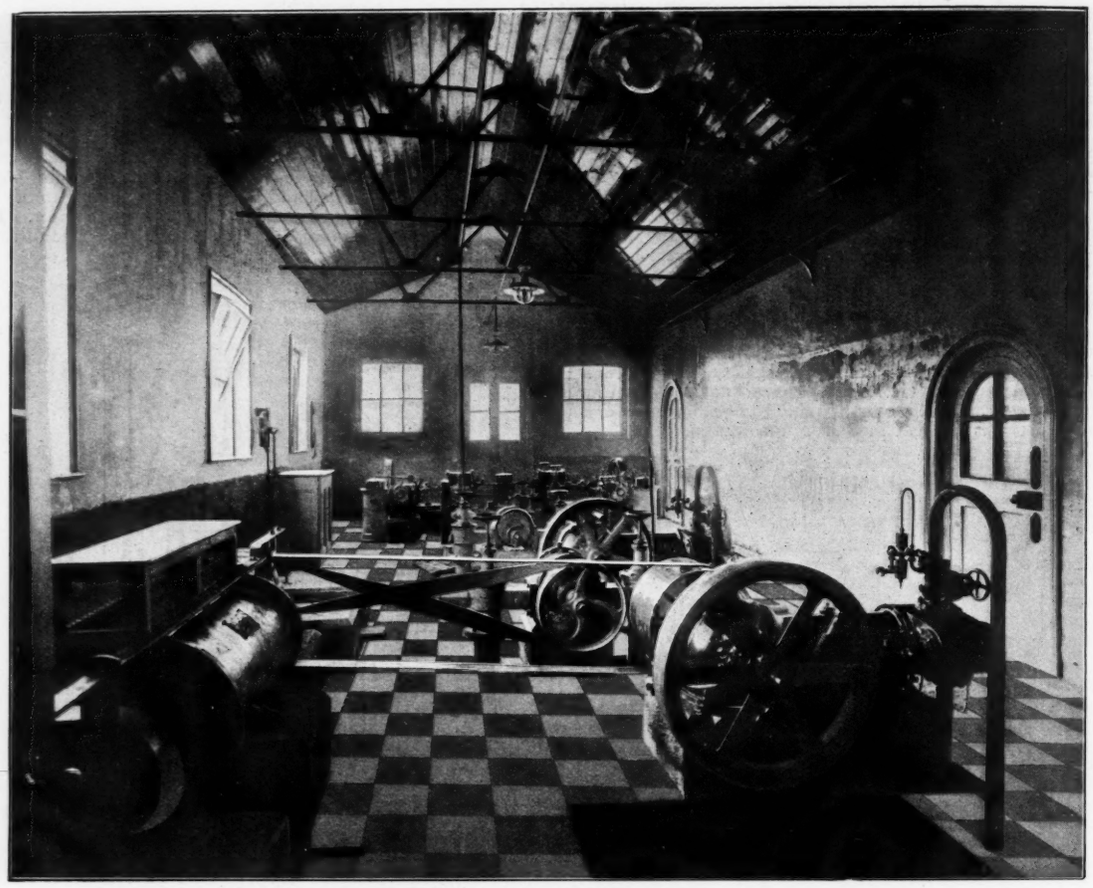
We need not enter into details respecting the plant; but it may be generally stated that the installation consists of a generator, 6 ft. in diameter by 20 ft. high, condenser scrubbers, high-speed engines, exhausters, blowers, and pumps in duplicate, station meter, relief holder, mixing meter, benzol carburetting plant, coke-charging stage, and steam-friction hoist. As will be seen by the illustrations, the plant is well arranged, is extremely simple, and easy to manipulate.

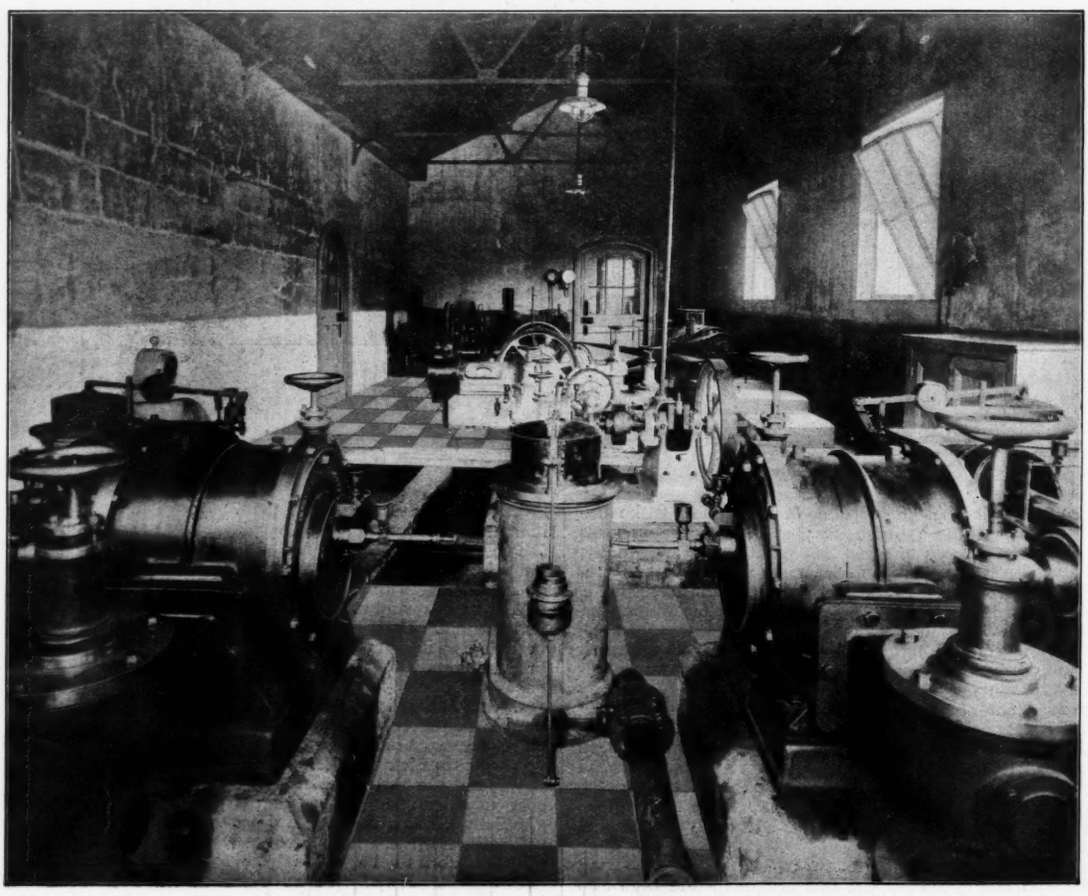
The method of working is as follows: The generator having been filled with fuel to the top, the fuel is ignited and blown up to a high degree of incandescence by an air-blast introduced at the lower part of the generator. The products or blast gases escape through nostrils placed part of the way up the generator, into the stack-pipe, and away into the atmosphere through the snift-valve. In this way, the fuel is raised to high incandescence for a definite height; and, with proper regulation of the air-blast, the blast gases contain considerably less than 1 per cent. of combustible gases. The fuel in the upper half of the generator—that above the nostrils—is dried and heated before coming to the incandescent zone or gas-producing section of the generator. The whole of the valves, blowers, and exhausters are operated by one lever, worked by means of a quadrant arm and spur-wheel, and indicated by three positions as "Blow," "Stop," "Run."

The necessary temperature having been attained, the lever is put over to "Run," which starts the exhauster, and by the same operation closes the blast and snift valves, and opens the gas-valve; and tar and steam are injected into the body of the incandescent fuel. Both the tar and steam are decomposed; the tar breaking up into carbon and gaseous products, while the steam, in contact with the incandescent and nascent carbon from the decomposition of the tar, forms water gas. At the same time that this action is proceeding, some steam is admitted at the bottom of the generator, and straight water gas formed. The various gases produced during this portion of the process pass upwards, together with the finely-divided carbon from the decomposition of the tar, which latter is filtered from the gas by the coke in the upper portion of the generator; and as the fuel gradually sinks, it is brought down into the zone of combustion below the nostrils, and, on account of its fine state of division, is utilized before the larger masses of fuel in the generator.

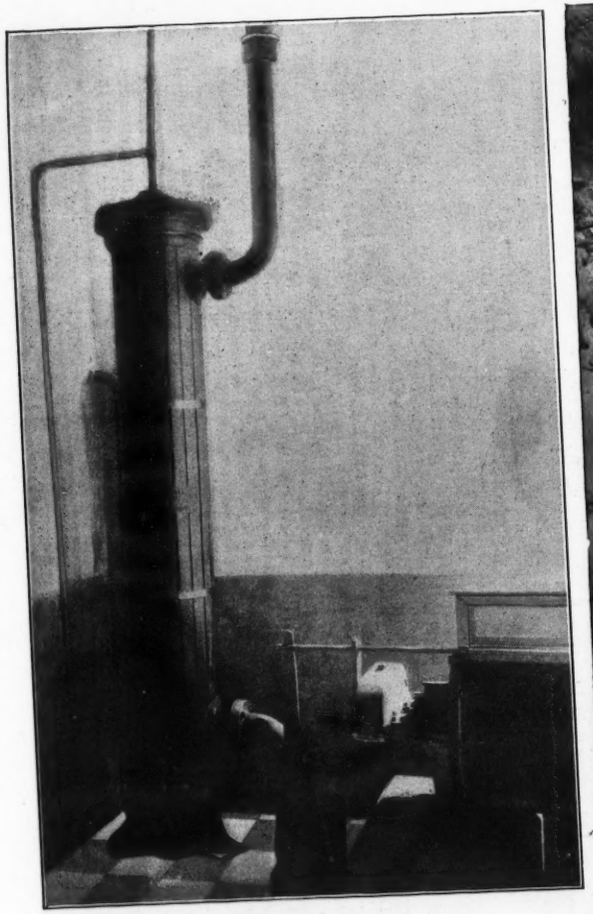
The mixture of hydrogen, carbon monoxide, and methane formed in the second period of action leaves the generator near the top, passes into the gas-main, and finally goes into a relief holder.

From a consumption of 1 gallon of tar and 28 lbs. of coke,

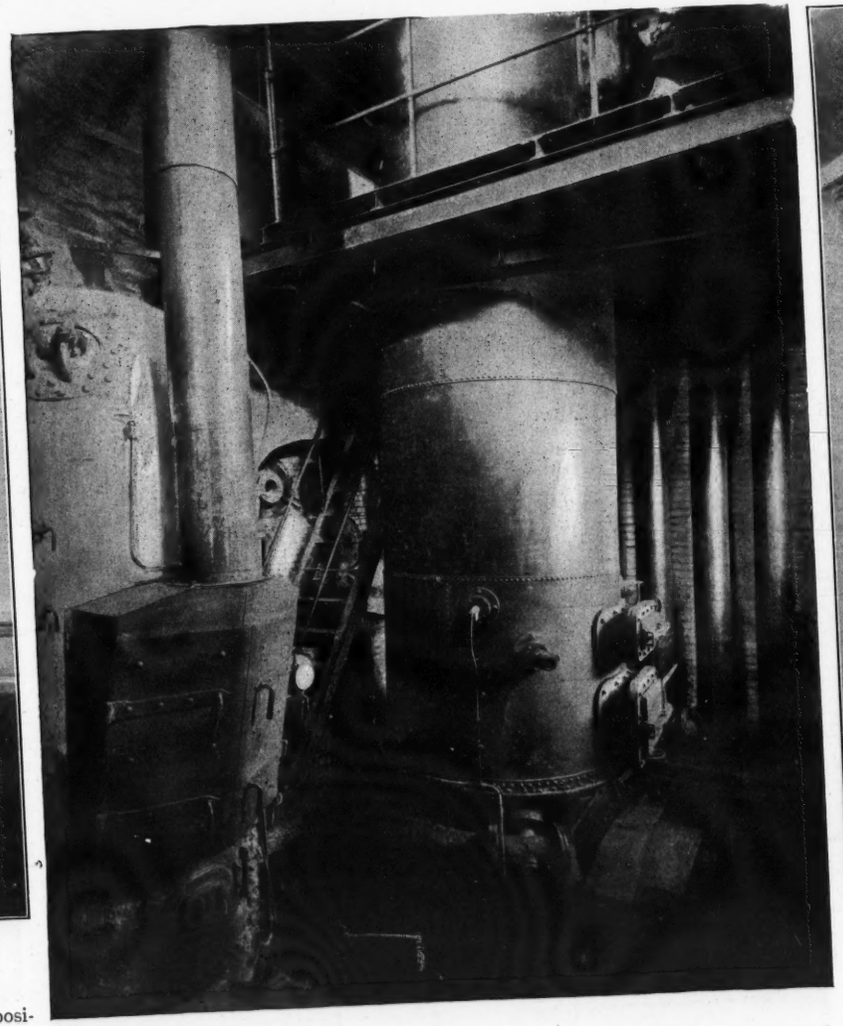




Two Views of the High-Speed Engines, Blowers, and Exhausting Machinery.



THE FEED-WATER HEATER.



THE GENERATOR.

BENZOL CARBURETTOR FOR ENRICHING GAS IN BULK.

1000 cubic feet of gas can be obtained. The composition of this gas before purification averages as follows:—

	Per Cent.
Hydrogen	58·7
Methane	10·0
Unsaturated hydrocarbons	1·3
Carbon monoxide	20·0
Nitrogen, carbon dioxide, sulphuretted hydrogen, &c.	10·0
	100·0

The calorific value of the gas is about 350 to 400 B.T.U. The methane-hydrogen gas, as made, is measured and passed into a storage holder, and mixed when heated with the coal gas at the foul main in a constant stream day and night, and in such proportion as may be required, varying from 30 to over 50 per cent. The mixed gases are then condensed, washed, and purified, and enriched up to the required candle power before going into the storage holder.

With 20 per cent. of methane-hydrogen gas and 80 per cent. of 15-candle coal gas, practically no enrichment is required to bring the mixture up to 15 candles illuminating power; it being found that when the methane-hydrogen gas is introduced hot into the foul main it picks up enrichment from the tarry particles in the coal gas which would

ctherwise be carried down to the tar well. With a mixture of 30 per cent. of methane-hydrogen gas and 70 per cent. of coal gas, ⅛ gallon of 90 per cent. benzol is required, and with a 50 per cent. mixture ⅜ gallon, per 1000 cubic feet, to bring the illuminting power up to 15 candles.

As a result of experiments with blue water gas and methane-hydrogen gas, it is found that the latter picks up enrichment in the foul main more readily, and retains it more tenaciously, than blue water gas; and as its structure more nearly approaches that of ordinary coal gas, it has been found possible to send out mixtures of 40 and 50 per cent. of methane-hydrogen gas without any appreciable interference with the various burners in the city. In order to watch accurately the working of the plant, a well-equipped laboratory has been provided on the works, fitted with Messrs. Alex. Wright and Co.'s water-gas photometer, calorimeter, and the various other chemical apparatus for the testing and analysis of gases. Indeed, throughout the works it is evident that Mr. Ingram is determined to have complete and accurate records of the various operations taking place; and as the plant is completely independent of the coal-gas works in every particular, it is possible to know precisely the cost of the gas as compared with the various other systems now in use.

Working of the Methane-Hydrogen Plant at the Truro Gas-Works during the Quarter ending March 31, 1905.

Date.	Gas Made.	Generator Fuel *	Boiler Fuel.	Operators Wages.	Tar Used.	Benzol Used.
Month of		Tons. Cwt.	Tons. Cwt.	£ s. d.	Gallons.	Gallons.
Jan.	1,862,320	33 0¾	18 18½	5 8 0½	None	528
Week ending						
Feb. 4	325,590	6 19	3 11¾	1 4 1	,,	114
,, 11	351,190	6 12½	2 11	1 1 9	,,	108
,, 18	231,410	5 8¾	2 7	0 17 4	122	72
,, 25	432,340	7 14¼	3 6	1 8 1	331	78
Mar. 4	290,010	4 18¾	3 6¼	1 0 7½	156	96
,, 11	354,540	7 5¾	4 10	1 6 10	188	120
,, 18	289,780	4 19½	3 16	1 1 0½	176	111
,, 25	270,860	5 6½	2 19	1 1 7½	168	75
Apl. 1	244,280	5 7½	2 18	0 18 4	144	48
	4,652,320	87 10¼	48 3¼	15 7 9	1285	1350

* The coke used in the generator is very high on account of intermittent working, and includes the fuel used in the generator when shut down between periods of make.

	Cost per 1000 Cubic Feet.
Generator, 87 tons 10¼ cwt., at 15s. per ton . £65 12 8¼	3·38d.
Operator's time 15 7 9	·79
Tar used, 1285 gallons at 1d. 5 7 1	·27
Benzol used, 1350 gallons at 1s. 67 10 0	3·48
Boiler.	1·00
	8·92d.

Gas made, 4,652,320 Cubic Feet.

Institution of Civil Engineers.—At the annual meeting of the Institution last Tuesday evening, the result of the ballot for the election of officers was declared as follows: President, Sir Alexander Binnie; Vice-Presidents, Dr. A. B. W. Kennedy, Mr. W. R. Galbraith, Mr. William Matthews, and Sir Leader Williams. Among the other Members of Council are Colonel R. E. B. Crompton, C.B., Mr. G. F. Deacon, Mr. Maurice Fitzmaurice, Mr. G. H. Hill, the Hon. Charles A. Parsons, C.B., Mr. Alexander Siemens, and Professor W. C. Unwin.

The Forthcoming Meeting of the German Association of Gas and Water Engineers.—It is announced that the forty-fifth annual meeting of the German Gas Association will be held at Coblentz from Thursday, June 29, to Saturday, the 1st of July. A reception will be held by the President on the evening of the 28th, and the meetings will commence at 9 a.m. on each of the three following days. The preliminary announcement of the meeting asks intending authors of papers to be read at it to forward them to Dr. Bunte, the General Secretary of the Association, not later than the 30th inst., and adds that visitors, introduced by members, will be welcomed to the meeting. It will be remembered that Herr L. Körting, the Manager of the Hanover Gas-Works, is President of the Association.

The First Gasboat.—The Engineering Supplement to "The Times" contains an article by Dr. A. Gradenwitz, of Berlin, on "The Possibilities of Gas Ships." In the course of it, he says the first gasboat designed according to the principles of M. Capitaine is a 25-horse power launch, with which some practical tests have been made. To show the advantage of this over steamships of similar performance, it should be mentioned that a 25-horse power steamboat used in comparative experiments was 18 metres in length and 4·5 metres in breadth, while the launch was only 11 metres long and 2·2 metres wide; the displacement of the steamboat was about four times as much as that of the launch. As the latter accordingly has to stand a considerably smaller resistance in the water, its efficiency will be greater in proportion than the steamboat. No stoker is required, while smoke and smell are absent, and risk of explosion is excluded. Whereas a 100-horse power gasboat uses about 35 kilos. coal, the consumption of a steamship will, on an average, be about 100 kilos.

COMPETITION FOR THE SUPPLY OF POWER.

By J. Ferguson Bell.

(*Concluded from p.* 99.)

In the first article, the figures given regarding the quantity of gas used for power at Stafford should be 20 million cubic feet instead of 30 millions per annum.

At Derby, in 1901, the total brake-horse-power of gas-engines in use was 810; and at the present time, including those on order or being fixed, the total is 1915—being considerably more than double in four years, notwithstanding the competition of electric motors and producer gas-plants. This increase has been attained chiefly by affording greater facilities to power users to obtain gas-engines upon low quarterly rentals (whereby they are enabled to purchase them by 12, 16, or 20 equal quarterly payments extending over three, four, or five years), along with an active canvass among likely customers.

The price charged for gas used for power, measured by a separate meter, is from 2s. to 1s. 9d. per 1000 cubic feet, according to the quantity used; the gradations being in pennies. This gives a mean average price of 1s. 10½d. per 1000 cubic feet, as compared with the mean average charge of 2s. 3½d. for gas used for lighting, cooking, and heating; being a reduction of 5d. per 1000 cubic feet upon that used exclusively for power.

If makers' list price of gas-engines be taken and divided by 12, this will be found to be approximately, for any size of engine from 2 to 50 brake-horse-power, the quarterly rental chargeable over three years, at the expiration of which the engine, &c., become the property of the hirer. This allows 15 per cent. upon the cost of the engine for fixing, and 5 per cent. per annum interest upon the purchase money actually outstanding, and a small sum towards the service and fixing the meter. The only additional expense the hirer is put to over and above a fixed charge for a limited period is that of providing the foundation for the engine, and bringing water to the water vessels.

The undermentioned are a few recent examples of engines fixed by the Derby Gas Company upon deferred payments extending over three years in twelve equal quarterly instalments. These prices include a gas-engine of recognized make, water vessels, fixing, service, and fixing meter:—

1½	brake-horse-power .	£2 10 0	per quarter over three years.
2½	,, ,, .	3 0 0	,, ,,
5	,, ,, .	4 10 0	,, ,,
8	,, ,, .	5 10 0	,, ,,
11½	,, ,, .	6 0 0	,, ,,
14	,, ,, .	7 15 0	,, ,,
17½	,, ,, .	9 0 0	,, ,,
22	,, ,, .	11 0 0	,, ,,
34	,, ,, .	16 5 0	,, ,,

The purchaser is required to enter into an agreement to complete the purchase within the time specified; and in default of punctual payments, assignment for benefit of creditors, or bankruptcy, the agreement may be terminated, and the Company retake possession of the engine, which remains the sole property of the Company until the purchase is completed. Thus for a small quarterly payment extending over three years, power-users may obtain a gas-engine suitable for their requirements without practically any initial capital outlay, and, in addition, the engine is supplied and fixed upon terms so reasonable that the user in three years' time becomes possessed of a valuable asset. No profit is made upon the transaction, as the author is of opinion that, in regard to all kinds of appliances, the consumer should be liberally treated—the main object being to obtain a user of gas.

It is advisable for gas-engines to be periodically inspected, diagrams taken, and reports sent to the users, so that the engine may be kept in good running order, annoying stoppages avoided owing to wear and tear not being observed, and slight defects remedied from time to time. This work should be undertaken if possible by those who supply the gas for a nominal charge per annum. It has the two-fold advantage of keeping the consumers in touch with the gas company, and tends to make things run smoothly. For gas-engines of over 20-horse power, the gas consumption may be taken at 16 cubic feet per B.H.P. hour at full load, at three-quarter load 17½ feet, at half load 22 feet, and at quarter load 27 feet. For the smaller engines, the consumption is very little in excess of the figures quoted for gas of 600 B.T.U. per foot. Thus an engine at full load, the charge for gas being 1s. 10½d. per 1000 feet, works out at just over ⅓d. per brake-horse-power per hour; being equal to electricity at ½d. per unit.

It is claimed by the makers of a well-known oil-engine that the consumption per B.H.P. hour at full load of a 40-horse power engine is 0·46 lb. of oil, which, at 40s. per ton, equals $\frac{1}{10}$d. per brake-horse-power hour. Yet the competition of this class of engine is not nearly so severe as electric motors, which cost for running many times that given for oil-engines; indicating that users of power are generally prepared to pay an additional sum for the convenience of having a supply of energy, whether gas or electricity, always available at a moment's notice, much or little being used, as may be required, without the inconvenience and loss of time attending its production from liquid or solid fuel.

Suction gas-producers appear to have of late a certain amount of fascination, although in most gas-works for many years past suction producers have been used for heating retorts—suction

being obtained by chimney-draught, instead of by a gas-engine piston or exhausting fan. The reaction in the producer by which the gas is generated, and the composition of the gas, are by no means novel; the novelty being confined to the name "suction gas-producer." A comparison between the composition and thermal value of the gas from an ordinary pressure producer and a suction producer will indicate that the latter is an inferior gas of less thermal value.

The author does not desire to make too much of the disadvantages attending suction gas-plants; but no doubt greater danger attends their use than when town's gas is used, and a certain amount of nuisance is inseparable from them, along with much greater liability to stoppages. And it will be for consumers to decide if these disadvantages are counterbalanced by any small actual saving in running costs, apart from paper demonstration. No doubt in many places where town's gas is costly or unattainable, there is a wide field for both pressure or suction gas-plants; but where cheap coal gas is available, power users will be ill-advised to seek a substitute in producer gas.

SOUTH-EAST OF IRELAND GAS ASSOCIATION.

The Annual General Meeting of this Association was held on Monday last week, at Waterford—Mr. J. PATERSON (Queenstown) presiding. The statement of accounts showed a balance in hand of £6 2s. 3d. The election of officers resulted as follows:—

President.—Mr. J. Richmond, of Kilkenny.
Vice-President.—Mr. H. Kirkham, of New Ross.
Committee.—Mr. G. Lennon, of Dungarvan, and Mr. D. W. Tooms, of Fermoy.
Auditor.—Mr. J. W. Norman, of Dublin.
Secretary and Treasurer.—Mr. J. G. Tooms, of Waterford.

An interesting paper by Mr. Kirkham, entitled "Incandescent Street Lighting," was read, describing the installation of public lamps in New Ross with incandescent lights twelve months ago. The author advocated "C" burners in preference to No. 3 Kerns as being generally more satisfactory, especially from the point of view of maintenance; and he also stated that he had a lower mantle account for his bracket lamps, rigidly fixed to brackets with old-pattern lanterns, than for his column lamps fitted with new improved special incandescent lanterns—anti-vibrators not being used in either case.

The paper evoked an interesting discussion; every member present having incandescent lamps in use in his own town for street lighting. Mr. Kirkham was congratulated on his mantle account—viz., 9 per lamp per annum.

Some alterations in the rules were adopted. The "Question-Box" is to be inaugurated at the next meeting, which is to be held in Kilkenny early in June. The meeting concluded with votes of thanks to the retiring officers.

THE INTERNATIONAL EXHIBITION AT LIEGE.

In previous issues of the "JOURNAL," attention has been called to the International Exhibition which is being held this year at Liége to commemorate the 75th anniversary of the independence of Belgium. The arrangements are sufficiently complete to allow of the opening of the exhibition next Thursday, when the inaugural ceremony is to be performed by Prince Albert of Belgium. As the British Government will not be officially respresented at the exhibition, the work of organizing the British Section has been undertaken by a Committee of private individuals; Sir Albert Rollit being President of the section. We understand that the English display will be substantial and representative, and will comprise exhibits by some well-known firms. Liége being in the front rank as a centre of commercial activity, by reason of its coal mines, blast-furnaces, foundries, iron and steel works, and other industrial establishments, the most important section of the exhibition will be that devoted to engineering, the largest display in which will be made by the Cockerill Company—the great local engineering firm employing between 9000 and 10,000 workmen. Art will find a place in the exhibition; and, following the examples of London and Paris, there will be an "Old Liége." There will not, we understand, be a striking display of appliances in which our readers are specially interested; but we hope to indicate next week any that may be worth special notice. In connection with the exhibition, a Petroleum Congress will be held from June 26 to July 1, under the patronage of the Belgian Government; and among the members of the Organizing Committee is M. Aerts, the Gas Engineer to the Municipality of Brussels. The third section will deal with the utilization of petroleum and its derivatives, and consequently comprise new systems of lighting, gas oils, and the manufacture of oil gas.

Owing to pressure of other engagements, the Right Hon. Sir Henry Fowler, G.C.S.I., M.P., has been obliged to resign his seat on the Board of the Power Gas Corporation, Limited, and Mr. Alfred Mond has been elected Chairman in his place.

POWER GAS, WITH SPECIAL REFERENCE TO SUCTION PLANT.

THE claims of suction gas-producers as competitors for power purposes with the ordinary gas supply of a town, compels due notice being taken of the utterances of their advocates, in order that those who have to meet their rivalry may know precisely their character and strength, both possible and active. As was pointed out in the "JOURNAL" on March 14, we all recognize how great an advantage town gas has on its side in the matter of convenience; but it will not do to prate too much about that if the price is not right. It is, however, a considerable and potent element in the competition, because manufacturers do not want to have the trouble, nor incur the uncertainties, of becoming gas makers even in a miniature sort of way, if, at a fair price, they can take their gas as and when wanted from the ordinary mains of the town. But it is all a question of price—whether the town-gas supplier will go low enough, taking into consideration the other superior advantages he has to offer, to make it impossible for the manufacturer to entertain the temptations of the commercial traveller with these gas-producers for sale. This point as to cost was one that was especially prominent in a discussion at the recent meeting of the Midland Association of Gas Managers, and has been brought forward in several articles in the "JOURNAL" since then. There are numerous makers of these suction producers now; and the salesmen are very busy, which is a fact that must not be ignored.

The main intention of this article is to let readers have the views of Dr. F. H. Bowman on the subject, as laid before the members of the Leeds Section of the Institution of Electrical Engineers. Dr. Bowman is very intimately concerned in the Dynamic Gas Company; and therefore what he has to say comes direct from the competing source. The first part of the paper is composed of generalities with which readers of the "JOURNAL" are perhaps more acquainted than the electrical engineers whom the author was addressing. For example, we all know that the improvements made during the last few years in internal combustion engines have given a great impetus to their use for all purposes, especially for the generation of electricity for light and power distribution. We are also all aware that the direct use of gaseous fuel in place of the employment of such a medium as steam, with all its costly adjuncts, has for many years been the dream of the engineer; and is now being realized—though not perhaps so "slowly" as the author indicates. Again, we are, of course, quite prepared to admit that the chief hindrance to the large adoption of the gas-engine up to comparatively recent times was the cost of gas, if obtained from the ordinary town's supply, or the nuisance and trouble arising to the user if independent gas-producing plant was employed, with its attendant danger of explosion, and the complaints arising from the odour in the neighbourhood. These offences of the latter are further intensified where bituminous coal plant is employed by the production of residuals, which it does not pay to recover unless the plant is on a large scale; and really the ordinary user of gas for power purposes does not, as a rule, wish to add a chemical trade department to his ordinary business. Perhaps also because, being electrical engineers, they are not supposed to know much about gas production, Dr. Bowman treated his audience to some elementary information on the laws of gasification. In passing, we note that he says: "Apart from use with small power gas-engines, illuminating gas as derived from distillation in closed retorts cannot be used for central lighting stations on account of its cost, except under special conditions, and where the bye-products can be utilized close at hand, and the coke also, in which case the gas itself may then be considered as a bye-product; and, in the author's own experience, in one large chemical works the net cost of 14-candle power gas, with a heat value of between 500 and 600 British thermal units did not exceed 1d. per 1000 feet. This, however, is altogether exceptional. The same holds good with coke-oven gas which is a bye-product, and is now used as a source of power, and which has a calorific value on the average of about 500 British thermal units."

It will not, in view of the subject being of present importance, be out of place to notice what the author has to say in reference to two factors which have to be taken into consideration in determining the nature of the producer plant to be employed to meet the requirement of the gas-engine user. These two factors are: The size of the plant and the fuel available; and the character of the locality and the space available. "The size of the plant," says the author, "is, of course, important, because it will determine whether it will pay best to use bituminous or non-bituminous fuel. For small plant, non-bituminous fuels—such as anthracite coal or coke—is much the best. They may be used either with pressure or suction plant; whereas bituminous fuel, such as ordinary coal, or lignite, or peat, can only be used in pressure plant. Presuming that the power required is in units of not less than 500-brake horse power each, it will pay to use either; but the plant for non-bituminous fuel is so much simpler, and requires so much less attention, that it often is much better to use such fuel, even when costing more per ton than bituminous fuel. When the works are apart from dwelling-houses or large residential districts, and when they are amid large manufacturing premises, where smoke and fumes are so prevalent that only a small increase in

quantity will make no difference, bituminous plant may be used. When, however, it is desirable to avoid even the appearance of a nuisance, then anthracite or coke, and preferably the former, must be employed. The space available also must be taken into consideration, and specially in large and crowded centres of population, where ground is costly and every available square foot is necessary for the generating machinery. Bituminous plant always requires more space than non-bituminous, because it is necessary to have a large space occupied by the condensing and purifying plant; and in case of the recovery of residuals, a more complicated plant still, which not only requires a large area but cannot be confined within an enclosed building. In addition also, as all bituminous plants are pressure plants, there is the necessity for large gasholders, unless the gas is consumed as rapidly as generated. Even in this case there is usually a small gasholder required to equalize the composition of the gas, which varies considerably from time to time, and also to give a more constant pressure. Non-bituminous plants occupy much less space and need little purifying arrangements; but, of course, when of the pressure form, there is the necessity for at any rate a small gasholder, as though they can be regulated in the production of the gas just as it may be required, in a manner which is impossible in a bituminous plant, still there must be some storage provided, or gas would have to be from time to time turned out into the air, and cause a loss in the economy of working."

It being the object of Dr. Bowman's paper not to describe the various forms of producers in existence, but the application of one form to central stations, it is only necessary to glance at them in general terms. For this purpose, they may be considered as comprising two classes: Pressure plant, where the air and steam are forced into the producer by means of a blowing-engine, a fan, or other form of blower, or a steam-jet. Pressure plant may be either: (1) For use with bituminous fuel; (2) for use with anthracite or other non-bituminous fuel, such as coke. Suction plant can only use non-bituminous fuel, like anthracite or coke.

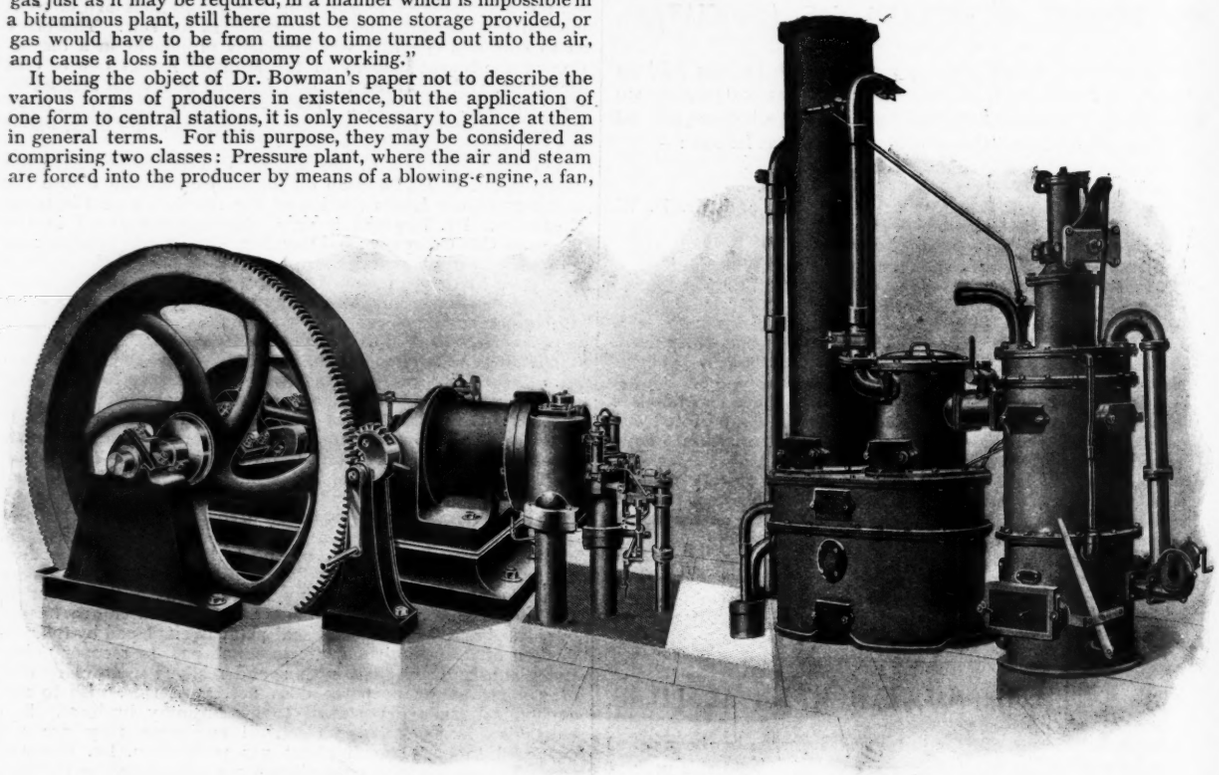


Fig. 1.

Dr. Bowman (omitting those parts of the paper which will not specially appeal to our readers) proceeds:

Up to the present time, the 1000-brake horse power gas-engine seems to be the largest practical and economic unit which can be taken from one cylinder even when double-acting; but multiple cylinder engines are being made from which a larger power may be obtained, and two or even four engines may be coupled so as to obtain a larger unit. Pressure plant with bituminous fuel may be used for these large units because they will generally be placed where there is sufficient space, and where bituminous fuel can be obtained cheap. It will pay also in this case to use recovery plant, and the sale of the residuals will in this country, probably for some time, go a long way in the reduction of the price of the gas and diminish the greater expense arising from the outlay of capital and expense of working. They are not, however, advisable for intermediate sized plant, and ought not to be put down for any size under 1000 brake horse power. Where units of above 2000-brake horse power are required in one machine, up to the present time steam is to be preferred to gas; but, of course, with gas units of 2000-brake horse power, any sized power station can be constructed, and no increase in size would give increased economy. Of these plants it is only necessary to mention the Wilson, Mond, Duff, Duff-Whitfield, and Dynamic bituminous plant. It must be remembered that in all these cases it is not every kind of bituminous slack which can be used. Only free burning non-caking coal is suitable for use in producers such as that which pertains in the northern part of the Nottingham coalfields, centred round Linby. Most of both the Lancashire and Yorkshire coal is unsuitable; and the writer knows of several cases where great disappointment has arisen, as the local coal was not available, and the increased cost of bringing the suitable coal from a long distance—such as from Nottingham into East Lancashire—considerably increased the cost of production. With a good bituminous plant and recovery of residuals and a modern gas-engine developing 1000-brake horse power on a full load, a brake horse power can be produced at a cost of under 0·2d. per hour, including everything. With a pressure plant such as a Dowson, using anthracite or coke, a brake horse power may be obtained, including everything, for about 0·45d. per hour. Besides Dowson, there are many makers of non-bituminous pressure plants, such as Crossley, Tangyes, Fielding and Platt, Paisley and Welsh, Daniels, and the Dynamic Gas Company. Anthracite and coke may be mixed, or the latter used separately as the fuel; but in this case the producer must be of greater capacity and provision must be made in the cooling and purifying of the gas to arrest the sulphur which is always present in the coke, and extra cleaning is required.

The best results known to the author on a 1000-brake horse power steam plant give 0·33d. per brake horse power, including everything. All pressure plants, however, have one disadvantage —they require power to produce the blast necessary to force the air and steam through the system; and they require storage for the gas unless the requirements are perfectly uniform, which is never the case, when the gas is used for power purposes. They require also a separate steam supply; and experiments have proved that when the best results are attained, about 16 per cent. of the total fuel used is consumed to generate this steam. Another disadvantage of this form of producer is that the gas being under pressure, there is a liability to leakage; and as the gas has no smell and is of a highly poisonous character, serious accidents have happened. Pressure plants are quite unsuited to confined spaces. Whatever form of producer is used, as the gas is of less calorific power than town's gas, a larger engine is required for the same power. The difference ought not to be taken at less than 20 to 25 per cent., but better results are frequently obtained.

In 1888, M. Bénier, a Frenchman, conceived the idea that these disadvantages might be overcome by arranging a closed producer in such a manner that the air might be sucked through the producer by a suitable pump, instead of forced into it by means of the steam-jet, and that the gas thus aspirated might be delivered stroke by stroke to the engine as and when generated, and thus do away with the necessity for using a gasholder. Also that the aspiration of the pump would produce a slight vacuum in the producer and scrubber; and thus the waste heat when cooling down the gas could be utilized in an open boiler to generate the steam necessary to be mixed with the incoming air so as to enrich the gas with the necessary hydrogen. This principle he put into

practice about 1889; but from various causes it did not come into extensive use either in this country or on the Continent, where, however, several trial plants were installed. In continuing his experiments, Bénier himself found that a separate pump was unnecessary, as the suction of the piston of the engine in its outward stroke was sufficient to draw the gas through the system.

Up to 1901, however, this form of producer was scarcely used in this country, partly on account of the general cheapness of gas; but principally in consequence of certain defects which were common to all the existing forms. The correct regulation of the steam to the air supply and the control of the fire while the producer was in operation was not provided for; while the exact proportions between the area of the fire and the heating surface of the boiler and the relations of these to each other and to the temperature of the furnace, and the relation of the whole to the size and speed of the engine was not understood. In making researches into the most economical sources of power for commercial purposes, the inventors of the Dynamic gas-producer came to the conclusion that if these relations could be determined, all difficulties in the use of suction producers would be overcome. Their endeavour was to exactly coordinate the producer and engine to each other so that the latter should have the complete control of the former. In this respect they have been entirely successful; so much so, that a large unit has been run for weeks continuously night and day with a regularity quite equal to the very best steam plant.

The composition of the gas from a "Dynamic" producer (of which a 70-brake horse power plant is shown in fig. 1) is practically the same as produced in a pressure plant using non-bituminous fuel; but it is much more regular, and the calorific value can go as high as 155 British thermal units. Its average value is about 150 British thermal units—being a mixture of producer and water gas. The engine and producer, however, in this suction plant being exactly suitable to each other, the engine has absolute control—not only of the quantity, but also the quality, of the gas, and the regularity in the composition much exceeds that from any pressure plant. Analysis of the gas taken from a Dynamic gas-producer, even when running on an irregular load, showed no variation exceeding from 148 to 155 British thermal units; and samples taken at regular intervals during many hours showed a regular average of about 42 per cent. of combustible matter. The producers can be made to drive any power required, and for which gas-engines can be made, and under suitable conditions more than one engine or a multi-cylinder engine can be driven from the same producer.

The one disadvantage of a suction gas-producer is that it cannot be worked on an absolutely light load for any length of time, because when no air or an insufficient quantity of air is drawn into the producer, the temperature of the fuel falls, and so at last it is reduced to the point that good gas is not produced. This is specially the case in plants where the volume of incandescent fuel is only small. The limit of satisfactory working on light load seems to be about one-fifth of the total load. A 50-brake horse power engine will not work for long under 10-brake horse power. In large units where there is a greater reserve of heat, the elasticity is greater, and no difficulty is experienced in taking off or putting on a large proportion of the load without any variation in the running.

If a comparison is made between a gas-engine using town's gas, and the same engine with suction producer gas, the results are very remarkable, and differ, of course, with the cost of the town's gas and the anthracite. A plant recently put down at the works of the Weldrivet Boiler and Motor Company, Limited, of Halifax, drives a 60-brake horse power Campbell gas-engine, and the

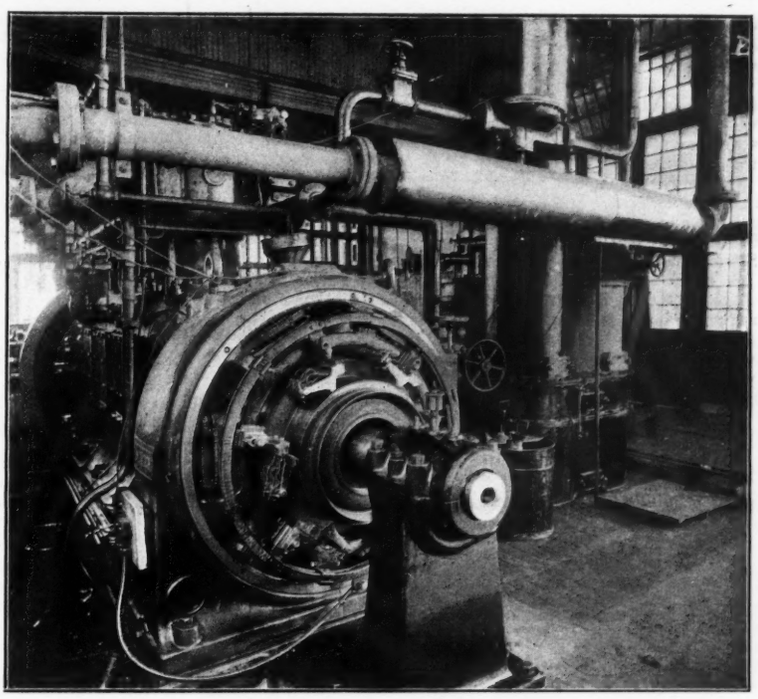


FIG. 2.—DYNAMIC GAS-PRODUCER.
Driving 130 B.H.P. Three-Cylinder Westinghouse Vertical Gas-Engine, with direct coupled continuous current 75 K.W. Dynamo,
at the works of the British Westinghouse Company, Trafford Park, Manchester.

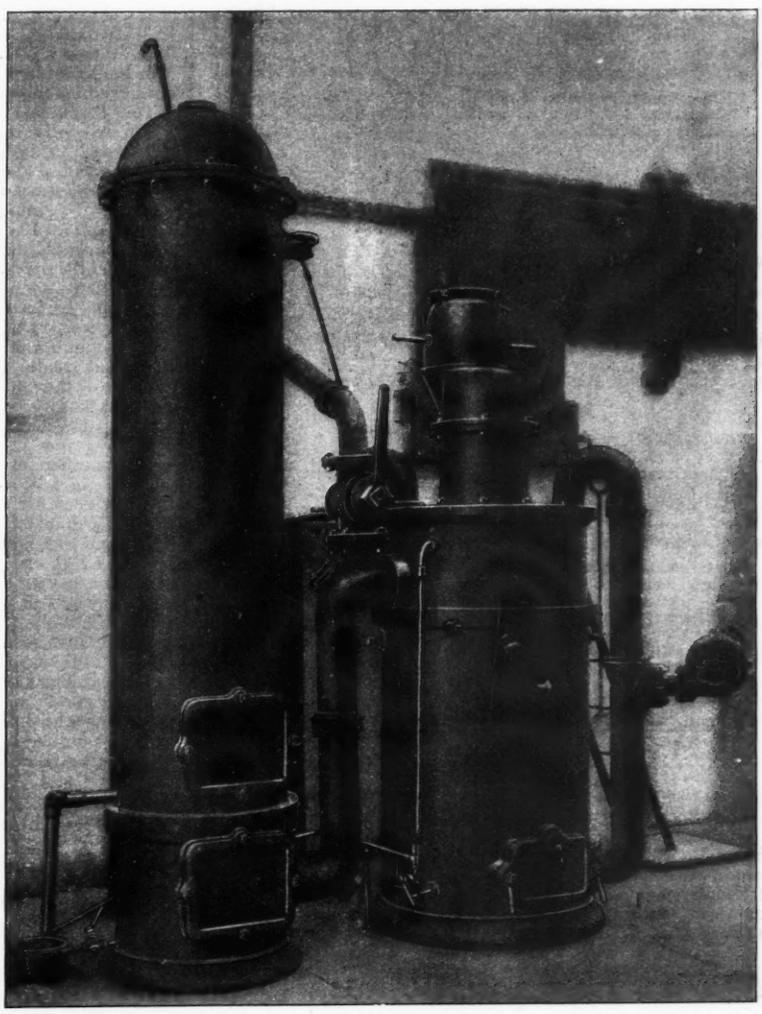


FIG. 3.—PLANT TO DRIVE A 60-HORSE POWER GAS-ENGINE.

power which is, on the average, about 30 to 40 brake horse power is distributed electrically. The cost per week of 54 hours with town's gas at 2s. 6d. per 1000 cubic feet was about £3 18s. per week. Since the suction plant has been put in, the cost of the anthracite coal has not exceeded 14s. per week, or rather less than $\frac{1}{10}$d. per brake horse power. Compared with using town's gas we may say roughly the saving is about: With gas at 1s. 4d. per 1000 cubic feet, 50 per cent.; at 1s. 9d., 60 per cent.; at 2s., 66 per cent.; at 2s. 6d., 70 per cent.; at 3s., 75 per cent.; at 3s. 6d., 80 per cent.; and at 4s., 84 per cent. These figures give the saving in fuel alone. Fig. 3 is an illustration of the plant referred to.

Some results of tests (in which the cost of fuel only, with coal at 32s. per ton, came out at $\frac{1}{7}$d. per brake horse power) are given of a small plant at the experimental station of the Dynamic Gas Company; and it is noted that since they were made, by the use of a special mixture of fuel, the cost of fuel per indicated horse-power has been reduced, the author states, to under $\frac{1}{13}$d. on a two days' test. Proceeding he says; Looking at the inclusive cost of a brake horse power we may take the value of the plant as—

Producer	£110
Engine	105
	£215

Cost of running per hour based on 300 days per annum of ten hours each = 3000 hours—

Quarter time of attendant, based on 25s. per week wages	£18
14 tons of coal, at 26s.	18
Oil, waste, water, &c.	10
Rents, rates, and taxes	10
Depreciation and interest, 10 per cent.	21
	£77

$\frac{77 \times 20 \times 12}{3{,}000 \times 12} = \frac{18{,}480}{36{,}000} = 0{\cdot}51$d. per brake horse power per hour.

Cost of a Dynamic Gas Suction Plant at a Small Electricity Station to give 500 *I.H.P., and on* 80 *per cent. Load* 360 *B.H.P.*

Dynamic gas producer	£600
Gas-engine delivered and fixed	3000
Buildings and foundations	500
270 kilowatt continuous direct-driven dynamo	1800
Switch-board resistances, cut-out, &c.	400
Total cost of plant	£6300

Cost of Working on 80 *per cent. Load for* 3000 *Hours per Annum.*

Interest and depreciation at 10 per cent.	£630
Wages	160
Cleaning and repairs of products	40
Oil, waste, and stores	120
Rates, taxes, and insurance	100
Sundries	50
380 tons anthracite cobbles at 25/- per ton	475
Total working cost	£1575

We have therefore $\frac{1575 \times 20 \times 12}{3000 \times 360} = \frac{378}{1080} = 0{\cdot}35$d. per brake horse power and 0·44 per kilowatt hour, including everything.

With continuous running, of course, better results can be obtained with the smaller type of plant (fig. 2); and the following may be taken as an example, being run continuously for weeks together at the works of the British Westinghouse Company:—

Cost of Gas Plant, &c.

130 brake horse power Dynamic gas-producer	£250
Cost of vertical three-cylinder gas-engine and 75 kilowatt direct-coupled dynamo, with switch-board	1600
	£1850

Cost of Running (say) 8700 *Hours per Annum on* 80 *per cent. Load.*

Interest and depreciation	£185
Three men at 28/- each per week, three shifts of eight hours	219
Oil, waste, cleaning, &c.	80
Water	100
Coal, 320 tons at 26/- (anthracite nuts)	416
Sundries	50
	£1050

$\frac{1050 \times 20 \times 12}{8700 \times 80} = \frac{252}{696} = 0{\cdot}36$ per brake horse power.

0·45 per kilowatt hour.

If there had been a free water supply	0·41	,, ,,
If on full load	0·31	,, ,,

The continuous improvements which are being made in gas-engines, however, seem to indicate that before long still larger units may be advantageously employed; and while the efficiency of the gas-engine is considerably higher than that of the steam engine at present, the possibilities of future improvement are much greater.

In a letter to "Engineering" on Dr. Bowman's paper, Mr. Hugh Campbell says:

Two points I wish to speak on are: (1) That suction-gas plants cannot run on light loads for a long period (Dr. Bowman places the limit of the load at one-third of the full power) without giving trouble; and (2) that bituminous coal has been unsuccessful in suction-gas plants. With reference to the first point, I think that Dr. Bowman cannot have had much experience in running suction plants on light loads, or he must have dealt with plants which were unsatisfactory. As a matter of fact, it is quite common for us to run ten to twelve hours at light loads—*i.e.*, the engine running absolutely without load. We have done this many times during the past agricultural show season; and we intend to do the same thing again this year. If Dr. Bowman has any doubt on this point of light-load running, I shall be very pleased to run him an engine at the forthcoming Royal Show on light load from 9 a.m. till 6 p.m. without stopping. I am well aware that there are many suction gas-plants which cannot keep up a good supply of gas on a light load for a lengthened period. Such plants, however, should not be allowed to condemn other and better plants which can do this duty. As to the second point—the use of bituminous coal—I think the Doctor is not quite up to date. I think if he will make some inquiries in the proper quarter, he will find that bituminous coal is being used in suction plants—the plant, of course, being made suitable for the work. I know, of course, that the plants using bituminous coal are not yet thoroughly before the public; but, still, Dr. Bowman's statement should be modified, or people may be misled.

In reference to this letter Dr. Bowman writes: "Mr. Hugh Campbell's remarks are evidently written under misapprehension. Suction producers can be made to run on a perfectly light load, but at a great sacrifice of economy. They will run well without loss in efficiency except what arises from the want of efficiency in the gas-engine down to one-fifth of the full load—not one-third as reported. Bituminous fuel is not suitable for suction producers, although I know producers are being made in order to try and utilize it with them. But so far none have proved a commercial success; and there is no gain in economy, as any gain in one direction has been lost in another."

OHIO GASLIGHT ASSOCIATION.

The President on the Making of a Successful Gas Man.

The Twenty-first Annual Meeting of the above-named Association was held at Pittsburg (Pa.) from the 15th to the 17th ult., under the presidency of Mr. F. W. Stone, of Ashtabula (O.). The business was transacted in the Hotel Schenley; and about 250 members had assembled there at the opening of the proceedings. They received a hearty welcome from Mr. John A. Blair, who represented the Mayor (the Hon. W. B. Hayes); and it was acknowledged by Mr. John D. M'Ilhenny. The reports of the Executive Committee and the annual statements of the Secretary and Treasurer (Mr. C. T. Jones) were then presented, together with the list of new members proposed for election—to the extraordinary number of 340—and they were adopted.

The President then delivered his Inaugural Address. He began by expressing his pleasure at addressing an assemblage of "gas men," for he was proud that the constitution of the Association was broad enough to admit to active membership anyone engaged in an occupation identifying him with the gas business, or otherwise qualified to assist in promoting the objects of the organization. It was good that men of all the departments of the industry should meet periodically, for they were all dependent one upon the other. The manager's success in selling gas was largely dependent upon the efficiency and variety of the appliances sold by the makers, and his success in manufacturing gas cheaply was, in a measure, due to the apparatus provided by construction firms. Satisfactory relations with the gas consumer depended greatly upon the accuracy of the product of the meter firms; and they, in turn, were dependent upon the gas companies for a market. The various industries were so closely interwoven, that any movement which caused a feeling of class distinction, or would organize any one department of the industry separately from the others, would, he thought, be unwise. He then went on to make the following remarks.

It has occurred to me from time to time that the gas business is popularly taken to be a second-rate one, hardly worth consideration, and that a gas man is not necessarily a man of ability. I cannot tell the reason for the misconception, unless it lies within ourselves, or that we have not valued ourselves sufficiently high, and the world has taken us at our own valuation. I am afraid we do not realize that this business we represent is one of the broadest and most important in the country—that in the amount of capital invested it will stand among the first ten, and that it commands financial, executive, and engineering ability of the very highest order.

It does me good sometimes, and it may do you good, to think of the qualities necessary to make a successful gas man. He must be a gentleman; be honest and industrious; have business, executive, and political ability; be a mechanic, engineer, and chemist. I care not which branch of the business he is connected with, every gas man must have these qualities to a greater or less degree, if he would be successful. Can you conceive of any other business demanding so wide a range of qualifications? Should we not be proud if we are achieving results? I think we all wish to make a success of our calling. Some few may be in the business for a livelihood only; but the large proportion of gas men are in the business because of their desire to advance in it, to do better work, and make more of a success than their fellows. If you please we are in it for the same reason that a man plays a game of cards; we like the excitement, and we wish to win. The stakes may be an inducement to win; oftentimes they simply indicate the winner.

Comparatively few were educated with the idea of entering

the gas business; and, in fact, I do not know of a course of education that will produce a good gas man. There are no colleges that give such a course; and if a young man were to ask me, "What books shall I read to learn the gas business?" I should be unable to tell him, for there is really no satisfactory up-to-date gas literature. To further complicate matters, it is a question whether the commercial or the technical side of the business is to the fore. I heard a prominent man in gas circles say recently that, given the choice of two men—one who could make friends with people and increase sales, or one with technical training who could economize and reduce costs of manufacture—the first would be the best selection as a manager.

Most of us have absorbed our education in the gas business. We have acquired it either from our own experience or that of others—mostly the latter; and in this educating process the Gas Association has been a most potent factor. I venture to say that two-thirds of us have received our gas education either through the papers read and the discussions which have taken place at Association meetings, or else from our conversation with other gas men at these meetings. That Association work is influential may be proved by the fact that the most successful gas men are those who are most active in Association work, which consists in both obtaining and giving. If we are all content to absorb the information our fellows give us, and do not give any in return, if we are content to benefit by the work of our fellow-men, and do none ourselves, we shall not receive the full benefit of that work and experience.

I have spoken thus fully of Gas Association work, and of what may be called the personal side of the gas business, because I wish you to feel that the business is really one of a high order—a profession to be proud of, a progressive calling, difficult to learn; that you are of consideration in the world, because upon your efforts the success of this business depends; that the more knowledge you have, and the more enthusiastic you are, the more successful you become; and that the Gas Association is a necessity to you, because more largely through that than any other source you derive knowledge and enthusiasm.

These Associations are making the gas literature of to-day. It is through them that progressive ideas are advanced, new methods advocated, experiences exchanged, and false practices exposed. What kind of a gas man would you be if you never came in contact with another gas man, or read any part of the proceedings of a Gas Association? No matter what your position—whether manager, book-keeper, stoker, salesman, or fitter—you are a necessity to the Gas Association, and owe it your heartiest support for the benefit derived.

At this, the twenty-first meeting, the Ohio Association comes of age; and this coming of age brings new responsibilities and new opportunities. Shall we meet them? We certainly shall if each member will work unselfishly. It is with pride that we view the year's work. Our increase in membership this year is unparalleled in Gas Association history. This is due to two causes—the solicitation of our friends and the reputation the Association has for doing things. We simply have to live up to this reputation. We are doing more efficient work than ever before, and we have to do better still.

Among the new departments inaugurated this year is a Bureau of Information, under the direction of Mr. H. L. Olds, which is becoming more useful every day. The Board of Revision, under the chairmanship of Dr. H. B. Harrop, had done excellent work in editing the "Question-Box" material; and it is hoped that the Board may be induced to continue its labours, as the results will form the basis of a permanent gas literature. Mr. D. W. Low has performed good work in perfecting the Bureau of Forms and Records; and it is hoped that this bureau will, by showing the members how different companies keep their books, help towards establishing a uniform system of accounting. It has been suggested that an Employment Bureau should be added to the working departments of the Association. Those desiring employment could file their applications, stating the class of work they are accustomed to and their qualifications. The employer needing help would, upon request, be furnished with the names of those whose applications are filed. Our industry is so scattered, with so few in each place, that it seems as if such a department would aid considerably in bringing employers and employees into contact.

It would be well if subjects discussed in papers presented to the Association could be followed to a conclusion. It is very seldom that a writer covers all points of a subject in one paper. A large percentage of the papers presented to the Association are voluntary contributions. They are valuable, and we are glad to have them; but they would be still more so were they followed by other papers dealing with other or new phases of the same subject. To do this thoroughly would, no doubt, involve the co-operation of the other Associations.

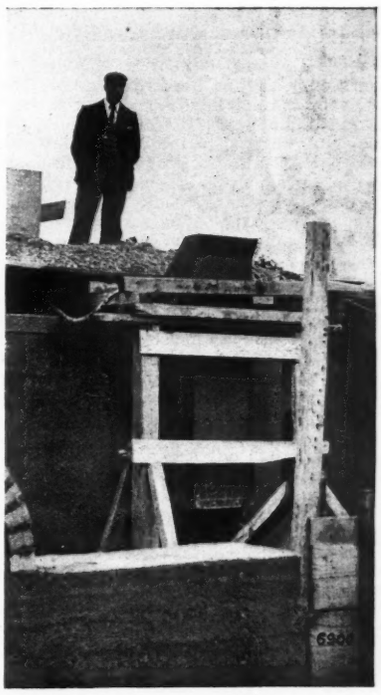
The notable event of the past year was the Gas Congress at St. Louis. The attendance was good. The papers presented were of very high order, and the discussions interesting and instructive. Altogether the congress was very successful, and will contribute a great deal toward bringing the various Gas Associations into closer touch. The year was one of activity along all lines; and the outlook is bright for another year of prosperity. There is a marked advance in the use of gas for industrial purposes; and it seems as though the cry of "Gas for Light, Heat, and Power" will be changed to "Gas for Power, Heat, and Light."

The President concluded with a brief reference to the programme prepared for the meeting, and to the losses sustained by the Association through death during the year. He thanked the members for their efficient and strenuous work, and expressed the opinion that if the spirit of fraternity and willingness displayed by them were continued, the progress of the Association would be assured.

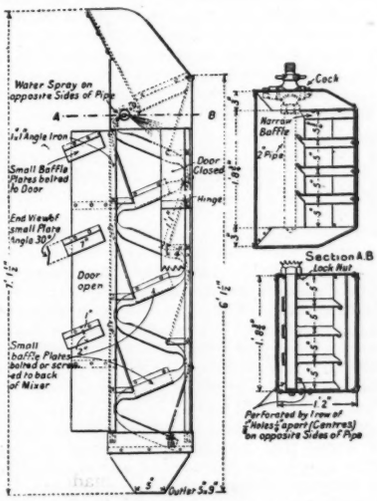
The papers read at the meeting will be noticed in subsequent issues.

A CONCRETE MIXER.

Concrete taking such a conspicuous part in gas-works structures upon which hangs a great deal of responsibility, and a thorough mixing of the materials being of the utmost importance to the solidity of the resulting work, we have pleasure in drawing notice to a mixer of simple design which has been invented by Dr. J. S. Owens, Assoc.M.Inst.C.E., of No. 15, Tothill Street, S.W.



OWENS' CONCRETE-MIXER.



DETAILS OF THE CONCRETE-MIXER.

The mixer consists of a shoot or casing hung vertically, and inside which are fixed a series of flat, sinuously bent, and twisted bars. These bars perforate, on each bend, the lower or free edge of large deflecting or baffle-plates, which are attached to alternate sides of the shoot as seen in the illustration. The plates slope downwards so as to force all material to travel down the central parts of the shoot, where it is split up and mixed by the narrow sinuously bent bars. These latter are so twisted (see plan and section) as to deflect the material to opposite sides as it falls from the large plates—*i.e.*, at the first bend it is deflected to the left; at the second, to the right; and in this process it is thoroughly mixed. It will be observed that *all* the material thrown into the hopper does not strike the narrow bars. But some of it falls between them; and in this lies the secret of thorough mixing. If *all* the material were deflected from side to side there would not be much mixing; but when part of it is deflected, and so thrown sideways into the undeflected part which falls in the spaces between the bars, there is a thorough incorporation of the ingredients. As this process is repeated eight times before the materials finally issue from the outlet, it will be clear that a perfectly mixed concrete must result; and this is thoroughly borne out in practice. When proper materials are used and the machine is fed regularly, the result is a better concrete than hand labour will give.

The great difficulty up to the present with gravity concrete mixers has been to secure proper wetting of the concrete; the

usual result being a mixture of slurry and half-dry concrete; and herein lies a great advantage possessed by the apparatus described. The machine it is pointed out hangs vertically; and the water, being supplied at the top behind the edge of the top plate in a fine spray, it travels with the concrete, and has no such tendency to separate as if the apparatus were worked on a slope. Further, the water travels down the sinuous bars or springs, in a film, and also drops from plate to plate; all the surfaces exposed to the concrete being thus kept wetted by a film of water, a perfect mixture results; and, when properly worked, there is not a trace of slurry. With this apparatus, two men can mix as much concrete as six would do by hand alone; 80 cubic yards a day being quite within its capacity. The saving being great, and the cost of the apparatus small, it opens up a field of usefulness hitherto untouched, as the small contractor or builder who does not deal in thousands of yards will find that it will pay him to use such a labour-saving device.

WORKING WITH DEEP PURIFIERS.

At the Annual Meeting of the New England Association of Gas Engineers, the following notes on the above subject were submitted by Mr. C. H. GIFFORD, of New Bedford (Mass.). The purifying-boxes at New Bedford are of the so-called "deep box" type. They consist of three duplex boxes, 16 feet by 20 feet, and 11 ft. 6 in. deep, with a dry lute instead of the usual water-seal. The connections are so arranged that boxes A and B can be made either first or second at will, while box C is always the third or catch-box. The inlet is through a pipe carried inside the box to the top and bottom of the box, while the outlet is from the centre of the box. The oxide is in two layers, each about 5 feet deep. Each box holds 2500 bushels of oxide; leaving about a foot space between the upper and lower layers.

The boxes were completed early last year, and put into commission on Feb. 10. The author said: We soon found that the usual lead acetate test was useless, as the second box showed foul very soon; but instead of growing rapidly worse, it remained in the same condition a long time. By reversing the flow of the gas in the first box with the use of air, it was possible to clean the second box somewhat. Box B, which happened to be the first one when they went into commission, ran 87 days, passing 38 million cubic feet, and when turned out it was taking out from 64 to 70 per cent. of the sulphuretted hydrogen. Box A ran for 73 days as the second box, and 42 days as the first; passing 30 million and 16 million cubic feet respectively, and was removing 65 per cent. of the sulphuretted hydrogen when changed.

We tried various lengths of time between reversals of the boxes—once a week, twice a week, every alternate day, &c. Our usual method has been to reverse the first box every Monday morning. It is our aim to use 1½ per cent. of air; but with the blower driven by the coal-gas exhauster, while the water gas has a separate exhauster, it is difficult to keep the percentage uniform. The two gases are mixed at the inlet of the purifiers.

Beginning with the 23rd of June, I have almost daily records of the sulphuretted hydrogen in the gas before each box, and also after the catch-box. From these records, I have prepared tables showing the same, as well as the percentage removed by each box and the percentage left in the gas after passing the catch-box. These tables were made by taking the record for the day on which the box was changed and each succeeding seventh day. These percentages do not total to 100 because the fractions were omitted. I have also compiled a table showing the number of changes made during the year, and the quantity of gas passed between them. On removing the oxide, it is found to be nearly uniformly fouled with a thin section in the centre of each layer showing cleaner. We usually empty a box one day and refill it the next, getting it turned in by the middle of the afternoon, and keeping it out of use from 30 to 35 hours.

By referring to the last table, it will be seen that the interval is no longer between the changes now than it was at first, and that more gas is purified, which is probably due to the oxide being in better condition. The oxide was home-made; and perhaps the iron was not thoroughly oxidized at first, as we were anxious to get the new boxes at work. I have never seen more than 6-10ths of an inch of back-pressure on any of the boxes, and this is reduced to 3-10ths or less on reversing the box. Box C (catch-box) was changed on the 6th of July, to make slight repairs to it; and since this time it has been continuously in use, and is still doing good work. I believe that if we had four boxes of the same size as at present, so arranged that they could be placed in any order of sequence, and the flow of gas reversed in any box at will, it would make the time between changes very much longer. In conclusion, I may mention that we have had absolutely no trouble with the dry seal on the covers.

The presentation of Mr. Gifford's notes led to some discussion. It was opened by the President (Colonel Richardson), who said he had in his works three purifiers 12 feet by 16 feet, and 11 ft. 6 in. deep; and they each took, in the way they were charged, 1300 bushels of material. Possibly the oxide they had was not perfectly made, or it might be that the straight coal gas was not properly produced; but, in any event, they had a very unfortunate and unsatisfactory experience with the deep purifier. He believed, however, with the right kind of oxide and with gas properly made, it was the correct principle, in view of the fact that it was possible to have any combination in the boxes, and that the catch-box was always available for change. In one year, in making less than 70 million cubic feet, they changed eight times. The oxide had to be left out of the box from eight to eleven or twelve days, and before the fourth day it had to be turned, not only by day but at night. The last three months, however, had shown an improvement. The most troublesome condition connected with the operation was the emptying of the boxes. There was a cellar underneath the set, and the doors opened below in the bottom of the boxes; but with their experience, only about four or five bushels would fall out from each opening without the use of a long iron rod, and it was an uncomfortable and dangerous operation for the men.

On the President inviting remarks on the subject before the meeting, Mr. Slade said he had had several years' experience with the Chollar box—a deep one—and it was very similar to that of

TABLES *showing the Number of Grains of Sulphuretted Hydrogen in* 100 *Cubic Feet of Gas before each Box and after the Catch-Box; also Percentage Removed by each Box and Left in Gas.*

—	Grains of H_2S in Gas.	Per Cent. H_2S Taken Out by	Grains of H_2S Left in Gas.	Per Cent. H_2S Taken Out by	Grains of H_2S Left in Gas.	Per Cent. H_2S Taken Out by	Grains of H_2S Left in Gas.	Per Cent. H_2S at Meter.
		Box B.		Box A.		Box C.		
June 23	328·9	87	44·4	11	1·3	1·2	..	..
,, 30	441·3	85	63·5	13	5·2	1·3	1·8	0·7
July 7	474·9	58	197·5	40	7·2	1·5	..	..
,, 14	407·6	85	48·8	11	2·8	0·6	..	..
,, 21	471·3	68	149·6	30	4·4	0·6	1·6	0·3
,, 28	464·1	71	132·1	27	4·8	0·4	2·2	0·4
Aug. 3	374·0	41	220·4	57	5·6	0·8	2·6	0·5
,, 4	..	..	388·9	95	18·7	4·0	2·4	0·6
		Box A.		Box B.				
Aug. 5	355·3	80	71·0	19	3·1	0·5	0·9	0·2
,, 12	380·1	90	37·4	9	1·8	0·4	..	..
,, 19	392·7	90	37·4	9	1·8	0·4	..	..
,, 26	377·5	89	39·9	10	1 8	0·4	..	..
Sept. 2	406·5	79	82·4	19	1·8	0·4	..	..
,, 16	326·7	62	123·4	35	8·0	1·0	2·1	0·6
,, 19	315·0	49	159·7	46	13·3	1·0	9·0	2·8
,, 20	..	..	333·9	93	21·7	3·0	10·1	3·0
		Box B.		Box A.				
Sept. 21	348·4	95	21·7	5	1·8	0·4	..	..
,, 28	312·1	94	18·1	5	1·8	0·5	..	..
Oct. 5	312·1	90	29·0	8	3·6	1·0	..	..
,, 12	239·5	87	29·0	10	4·1	1·0	1·0	0·4
,, 19	238·5	84	36·3	13	4·5	1·0	1·0	0·4
,, 26	326·7	79	68·9	19	3·6	1·0	..	..
Nov. 2	283·1	68	90·7	30	5·4	1 0	1·2	0·4
,, 9	275·9	52	131·3	44	8·3	1·0	3·6	0·1
,, 16	276·6	64	76·3	32	5·7	1·0	1·8	0·8
,, 21	279·5	44	156·0	52	9·5	1·0	6·3	1·7
—	—	Box A.		Box B.		—		
Nov. 21	304·9	88	34·6	..	39 9	11·0	5·4	1·7
,, 23	272·2	90	25·4	6	7·2	1·0	4·5	1·0
—	—	Box B.		Box A.		—		
Nov. 28	319·4	59	130·6	30	32·6	7·0	9·5	2·0
,, 29	..	..	373·8	90	36·3	7·0	9·5	2·0
		Box A.		Box B.				
Dec. 1	363·3	96	42·5	1	7·2	1·0	1·5	0·4
,, 7	297·6	84	47·1	14	3·6	1·0	..	..
,, 14	373·8	89	39·9	9	3·6	0·9	..	..
,, 21	275·8	65	94·3	31	8·1	2·0	1·8	0·6
,, 28	271·2	66	90·7	29	10·3	1·0	5·4	1·9
1905.								
Jan. 4	319·4	90	29·0	8	4·7	0·6	2·5	0·7
,, 11	308·5	85	36·5	10	5·9	0·6	3·6	1·0
,, 18	317·2	91	26·4	6	5·4	0·9	2·5	0·7
,, 25	326·3	94	18·5	3	7·2	1·0	2·0	0·6
Feb. 1	326·7	93	21·7	3	10·8	2·0	1·8	0·5
,, 8	257·7	93	18·1	3	9·1	2·0	2·5	0·9

TABLE *showing Changes of Boxes and Gas Passed between Changes.*

Box.	Days, Second Box.	Gas Passed in Thousands.	Days, First Box.	Gas Passed in Thousands.	Total Days.	Total Gas in Thousands.
B . .	73	29,995	87	38,160	87	38,160
A . .	42	15,651	42	16,251	115	46,246
B . .	42	16,235	44	16,997	86	32,648
A . .	46	20,137	48	20,671	90	36,906
B . .	69	35,615	70	36,226	116	56,363
A . .	69	43,260	71	43,649	140	75,269

the President. They found that when they went to clean the boxes, the oxide was extremely hard, and had to be picked out—just like getting into concrete. They had trouble with the oxide firing in the box while it was being removed. The conditions of emptying the boxes being so hard, they very naturally made the changes as few times as possible; and by reversing the flow, the boxes would sometimes, but not always, clean themselves. They had in the Chollar system two boxes, and as a result of this they would sometimes have to get in and clean a box in a hurry. Another trouble was that they were not always certain as to when to discontinue the oxide before it was spent. He said he should like to ask Mr. Gifford if he had any test to determine this other than the old-fashioned one of trying it, and finding out from practical use whether or not it was done. His personal experience led him to the conclusion that the shallow box was better than the deep one, inasmuch as it was more conducive to peace.

Replying to the question, Mr. Gifford said they had not worked them long enough to find out. He thought he made last year 174 million cubic feet of gas after the boxes were put into use, with five changes on the first and second boxes, not counting the one on the catch-box, which was changed to effect a little repair. They had some trouble in getting the oxide out of the boxes. With the first one emptied they had the oxide on fire. They had four openings in the bottom of each box. Since then he had only opened two at a time, and put six men in a box to get about half the oxide through two holes. Then they had no trouble from fire occurring. If a hole were opened through the bottom, it made a chimney, and there was a draught right up through, with the conditions as favourable as possible for getting into trouble. They always had an extra box, and had four batches of oxide. They got the foul oxide on to the floor, and spread it out the same afternoon. Next morning they filled the box with a fresh batch that had already been oxidized or had been turned over. The President remarked that this explained how the box could be filled the next day. In his case, they had paid more than $45 for labour in unloading, attending to, and recharging a single box 12 feet by 16 feet, and 11 ft. 6 in. deep. He thought a larger, but shallower, box would be less likely to cause embarrassment. Mr. Gifford said he recognized the fact that it was a rather hard thing to put a man into these boxes. He usually had all the help necessary—even rather more—when he changed a box; and he personally watched the operation until the box was empty, to see that there was no accident. True, they occasionally took in all the gas that was good for them, but he had never had to help a man out of a box. The President expressed surprise that Mr. Gifford should have leisure to stand by during the emptying operation. Mr. Gifford replied that he did it nevertheless, as it was cheaper than killing a man.

The next speaker was Mr. Coffin, who said he had boxes 10 feet by 16 feet, and 7 feet deep. They were arranged to run up-right through the whole mass, or run into the middle and up and down. They were then running them up, and had done so for about 18 months without any difficulties arising. They made a shaving scrubber of the first box, and it caught all the oil and tarry vapours that passed the condensers. They never used any air. They ran about 10,000 cubic feet of gas per bushel of oxide, which was more than double what they were ever able to do before. With the tarry or oily vapour taken out, their sponge did not harden up at all. They were using the sponge put in a year ago last September, and it apparently had not begun to fall off. They had four boxes, and always had a spare dose; and they also had plenty of time to revivify. They changed a box, and went on for six or seven weeks before they would have to change again. They had a valve system. They could not reverse, but they could run one box, or Nos. 2, 3, or 4; but they must be in sequence. When they wanted to change the shaving scrubber to revivify it a little, they simply worked without it—just ran Nos. 2, 3, and 4, and cut the other out. They were not having any trouble whatever.

A question was put by the President as to how many thousand cubic feet of gas could be reckoned as a fair average per bushel of oxide. Mr. Gifford replied that he had not worked it out; but the Secretary pointed out that the lowest figure in the tables between the changes—viz., 116,251,000 cubic feet—was a trifle over 6000 cubic feet to the bushel; and in the case of the last figure given, which was 43 millions, it had already passed something like 17,000 cubic feet per bushel, and was still working. Another question put was in regard to laying the oxide in the boxes evenly. Mr. Gifford said they could not put it in evenly with the elevator; they had to spread it with shovels. They usually spread the oxide, and tramped it as hard as possible on the outer side, leaving it light in the centre. In this way they got a fairly good distribution. The last speaker was Mr. C. F. Leonard, who works with ordinary shallow boxes. He stated that where they formerly changed once in two or three weeks, using 1·8 per cent. of air, by having a valve system and by reversing they were enabled to go five months under exactly the same conditions, except that they formerly ran Nos. 1, 2, and 3, with the fourth box off, and then started in the reverse direction. The valve system was such that they could reverse No. 2 and No. 1, but not No. 3. This left two boxes (Nos. 3 and 4) not doing anything. They then tried Nos. 1, 2, 3, and 4, allowing the purified gas to go through the dirty box and clean it up. Mr. Leonard added that there was a tendency to produce tar in the bottom of the box—at least, it collected there, and the drips did not carry it off—with the result that once it caused a caking 3 or 4 inches thick, which had to be taken out with a pick. The tar reached the purifiers owing to there being no shaving scrubbers to intercept it; but by abandoning the system of running down they obtained much better results.

REGISTER OF PATENTS.

Water-Gas Apparatus.—Thuman, F., of Victoria Street, S.W. No. 6335; March 15, 1904.

In water-gas apparatus known as "twin generator" apparatus, the patentee points out that two generators are, for reasons of economy, used in such a way that, during the "blow," air is forced through both generators in parallel; but during the "run," the steam, or any desired portion of it, is passed through the two generators in series. In order to maintain safe and efficient distribution of heat in the fuel beds, it is essential that the make of water gas be reversed in its direction of passage through the fires. Owing to the frequent intermittence of the water-gas "runs," and the hasty intervening manipulation of the valves for the "blow," the operator is liable to make two or more runs successively in the same direction through the generators—"thus disturbing the heat distribution, with loss of efficiency and risk of overheating and damaging the apparatus." Furthermore, as explained in patents No. 23,904 of 1896 and No. 24,934 of 1897, "there is grave danger, in the alternate production of water gas and blast gas, of the formation and ignition of explosive mixtures of water gas and air in parts of the apparatus, and means were described for obviating this danger; and in the operation of twin-generator apparatus there are additional sources of such danger." The object of the present invention is "to obviate these dangers, for which purpose the apparatus is provided with controlling and safety devices that prevent the operator manipulating the cocks and valves except in safe and proper relation."

First. To ensure each fire getting an equal portion of the air supply, and consequently to avoid excessive over-heating in one of the generators during the "blow," as well as to prevent the formation of an explosive mixture of fuel gas and air, the valves controlling the blast-gas outlets from both generators are so interlocked with the air-supply valves that it is impossible to open the latter until both the former are completely open, and, conversely, the gas-outlet valves cannot be closed until after the air-supply valves have been completely closed.

Second. To avoid the formation of an explosive mixture in the air and gas passages at the bottom of the generators or in the ash-chambers, the residual air must be expelled from them at the end of each "blow" and the residual water gas at the end of each "run." This is accomplished by so interlocking the steam-admission valve with the gas-outlet valves of the generators and so connecting the valve which controls the direction of the flow of steam through each generator with the corresponding gas-outlet valve, that residual air and gas are expelled by steam at the end of each "blow" and "run" respectively.

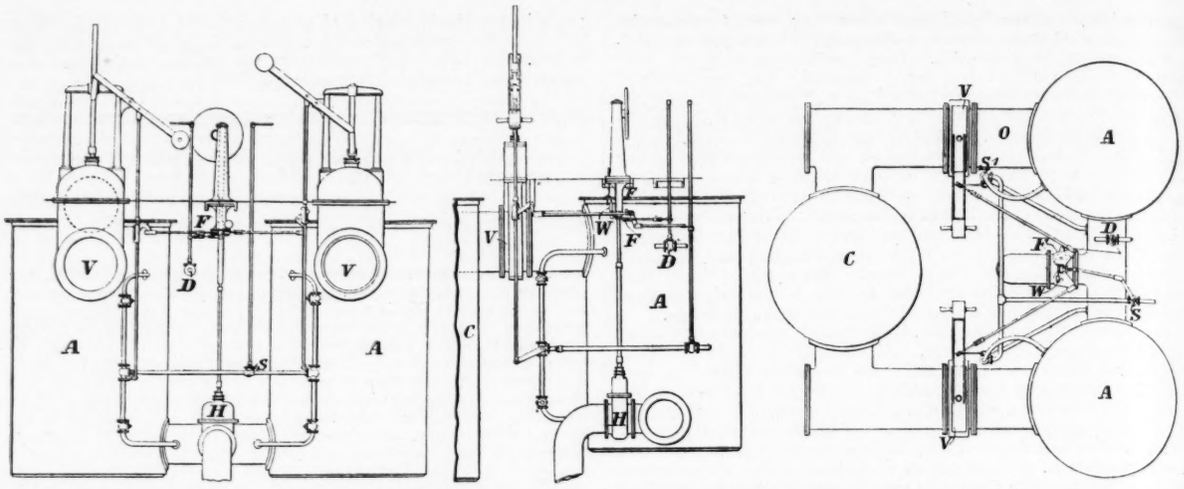
Third. The movements of the valves controlling the direction of the make of the water gas are governed by a device common to the valves of both generators, and automatically actuated by their movements in such a manner that the valves, in the ordinary course, may be operated only in safe and proper sequence. An indicator is also actuated by the movement of the valves so as to always show the gas maker the direction of the make of water gas and inform him of the proper succeeding movements. This enables him to take the proper steps at all times without hesitation or record; while the interlocking gear, of course, effectually prevents improper action.

Fourth. When such water-gas generators form part of carburetted water-gas apparatus, it is advisable to provide against the possibility of admitting oil to the carburettor during the "blow," to obviate both the waste of oil and the possibility of oil vapours travelling back through the fuel beds and forming an explosive mixture with air in the bottom of the generators and in the air-blast system. This is accomplished by so interlocking the oil-admission cock with the air-admission valve or valves that the former cannot be open at the same time as the latter, and *vice versa*.

Fig. 1 (p. 236) is a plan, with parts omitted, of carburetted water-gas apparatus of the "twin-generator" type and having one arrangement of controlling and safety appliances applied thereto according to this invention. Fig. 2 is a side elevation with the near generator removed. Fig. 3 is a rear elevation with the carburetting chamber and the portions of the take-off pipes in the rear of the valve-chambers removed.

The generators A are connected with each other near their bottoms by a conduit, and with the carburetting vessel C near their tops by valve controlled passages O. H is a valve controlling the admission of air to the generators and operated by means of a valve-rod and rack and pinion standard. V are the valves controlling the gas-outlet or take-off passages from the tops of the generators to the top of the carburettor; these valves being operated by levers, as shown in fig. 3. S is a steam-cock controlling the admission of steam to two three-way steam-cocks, which control the distribution of steam to the generators and are automatically set in proper position by the movement of the gas-outlet valves V. The steam-supply cock S is operated by a rod and handle. D is a cock controlling the admission of oil to the carburettor, and is also operated by a rod and handle. F is the interlocking device, the construction of which will now be described—its several functions being explained in the order in which they have been already mentioned.

First. To ensure, during the "blow," each generator getting an equal portion of the air supply, the valves V are interlocked with the air-valve H in the following manner: Interlocking sectors are pivoted to the frame of the interlocking device and respectively connected to the corresponding gas-outlet valve V by rods, bell-crank levers, and other rods, which couple the levers of the respective valves with the levers of the corresponding steam distributing cocks of the generators, as shown. By means of these rods and levers, the movements of the



valves V are transmitted respectively to the interlocking sectors. The air-valve rod slides through the interlocking device at right angles to the plane of movement of the sectors, and is formed with two notches arranged on opposite sides of the rod and at the same level. One set of notches register with notches in the sectors when the valves V are wide open and the air-valve H is closed; and it is only then that the parts of the interlocking device occupy such positions that the sectors are free to be turned about their pivots, and one air-valve rod is free to slide through the notches in the sectors, so that either of the gas-outlet valves can be closed, or the air-valve can be opened (unless otherwise locked). Should one of the gas-outlet valves be even partly closed, the sector will be turned about its pivot to a new position, and the notch will no longer register with the notch in the air-valve rod, so that the latter will be held by engagement of its notch with the edge of the sector. The same will be true if the gas-outlet valve be moved from its full open position. Consequently, air cannot be admitted into the generators unless both valves V are in their fully-opened positions. Moreover, should the air-valve H be even partly opened, the notches in the air-valve rod will no longer register with the sectors, and the engagement of the notches of the sectors with the rod will then prevent movement of the sectors and make it impossible to close the valves V.

Second. To provide for the expulsion of residual air after each "blow," and of residual water gas after each "run," the actuating rod of the steam-cock S is connected by a lever and rod to a bell-crank pivoted to the interlocking device F. The arrangement is such that when the steam-cock is shut, the arm of the bell-crank prevents the rotation of both the sectors in the direction corresponding to the closing movement of the valves V. Therefore, even when the air-valve H has been completely closed at the end of the "blow" and no longer interferes with the closing of either of the valves V, these latter are still "blocked" and cannot be closed until the operator has opened the steam-cock S, and thereby moved the arm of the bell-crank out of the path of the sectors. The opening of the cock S allows steam to pass through the branches and the steam distributing cocks, which are linked by the rods to the actuating levers of the respective valves V, in suchwise that, when the latter are open (as they must be at the moment the steam-cock S is opened, since they cannot be closed until it is opened), the cocks direct the steam through the branch pipes into the bottoms of both the generators. It is evident then that before a "series run" can be started, steam must be passed up through both generators in parallel—thus expelling the residual air left from the "blow" in the passages and ash-chambers at the bottom of the generators, and preventing an explosive mixture of water gas and residual air being formed.

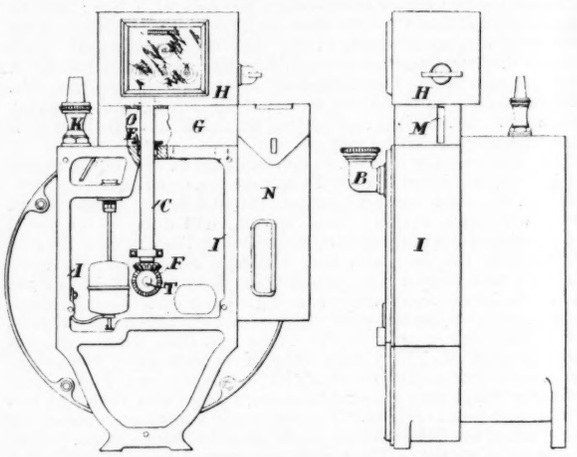
Third. In order that, in regular running, only one of the valves V, may be closed at a time—viz., the one which was left open during the preceding run—they are interlocked with an automatic governing device comprising a weighted "governing sector," pivoted to the frame of the interlocking device F, and turning about its pivot and engaging alternately with one or the other of the notches of the sectors. When it engages with one notch, it prevents the closing of one valve V, but so that the other valve V is free to close. The closing movement of the latter valve makes the sector turn about its pivot, and a tappet bolt or push bar that is mounted on a pivot fixed to the sector, by pushing against a pin projecting from the lever of the governing sector, makes it turn about its fulcrum until it passes beyond its vertical position, when the weight W, by gravity, causes its further movement until its point rests against the under side of the sector.

Fourth. The oil-admission cock D is interlocked with the air-valve H by means of a lever on the rod, which transmits its motion to a sector pivoted to the underside of the frame of the interlocking device. The sector has a notch on its circumference, which registers with a notch in the air-valve rod when both the air-valve H and the oil-cock D are closed; but when the air-valve is open, its rod prevents the opening of the oil-cock D, and, conversely, when the oil-cock is open, the sector engages with the notch of the air-valve so that the latter cannot be opened.

Wet Gas-Meters.—Anderson, J., of Edinburgh, and Mackay, J., of Bradford. No. 7484; March 29, 1904.

This invention relates to means for converting ordinary or continuously registering wet meters into coin-freed prepayment wet meters —especially 2 to 10 light ones—by mounting the prepayment mechanism upon a distance-piece secured to the meter to be transformed and having a coin-guide adapted to direct the coins discharged from the coin-pocket into a suitable receptacle; the distance-pieces being of such height as to project above the body of the meter and support the prepayment mechanism clear of the meter body.

An illustration is given of a wet meter which has been converted into a coin-freed prepayment meter according to this invention. The indicating dial box, water supply cup, registering shaft, and worm gearing are removed from the meter, and the holes for the registering shaft and water supply plugged up. A new hole for the registering shaft C is drilled on a line which coincides with the vertical centre-line through the meter, and prepared for the reception of a stuffing-box gland E, to prevent any escape of gas along the line of the registering shaft. Mitre wheels F are substituted for the worm gearing previously used, so that the registering shaft revolves at the same rate as the drum spindle T. A distance-piece G is placed on the flat top of the chest of the meter. It is of any suitable height and breadth, but preferably



made so high that the prepayment mechanism H, on the top of the distance-piece, may be kept flush with the meter chest I, and at the same time clear the back of the meter. The distance-piece is made of a length sufficient to give free access to the gas connection K, and has a coin-slot on the top, which opens into a coin-guide M, leading to the side of the distance-piece and opening into the coin receptacle N, attached to one of the vertical sides of the meter chest I and provided with a locking device. The registering shaft C, after passing through the stuffing box and gland E and distance-piece G, enters the prepayment mechanism H, and actuates the indicating pointer. A collar O, resting on the distance-piece, prevents any longitudinal motion of the registering shaft.

The coin-freed prepayment mechanism H is preferably of the type described in patent No. 26,369 of 1897, or of any other suitable type. The water-supply cap B is attached to the meter-chest cover, which has a pipe in a convenient position for conducting the water to the float-chamber.

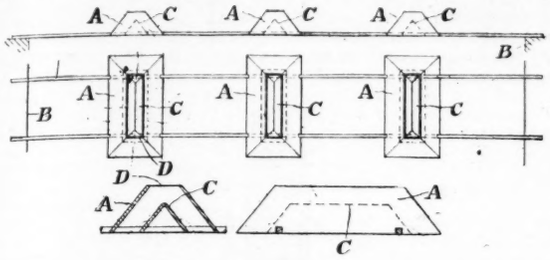
By using the distance-piece referred to, an ordinary wet gas meter can be converted into a coin-freed prepayment meter with a minimum of alteration—obviating the necessity of cutting slots in the meter casing for the coins. The use of the distance-piece also lends itself to general application, as it can be modified to meet special circumstances; while "for the types of meters in general use, the number of standard sizes of distance-pieces would not be excessive."

Mixing Device for Gas-Retorts.—Ashby, C. J., of Bradford. No. 8659; April 15, 1904.

This invention relates to hopper-fed inclined retorts; and its object is "to uniformly mix the large, medium, and small pieces of coal."

The illustration (p. 237) shows an elevation of three distributors fitted over a hopper; a plan of same; also a cross section and an elevation on a larger scale of one of the distributors.

The patentee proposes to mount truncated pyramids A above the hopper B upon cross-bars or other suitable supports. A smaller pyramid C, supported by the same cross-bars, is placed within each truncated pyramid; and the base of the former is approximately the same size as the opening D in the top of the latter. The coal is delivered by the elevator or its equivalent on to the tops of the truncated pyramids, and sliding down the sides of the inner and outer pyramids is thrown into the hopper in an inclined direction on all sides, and "is thus evenly distributed."



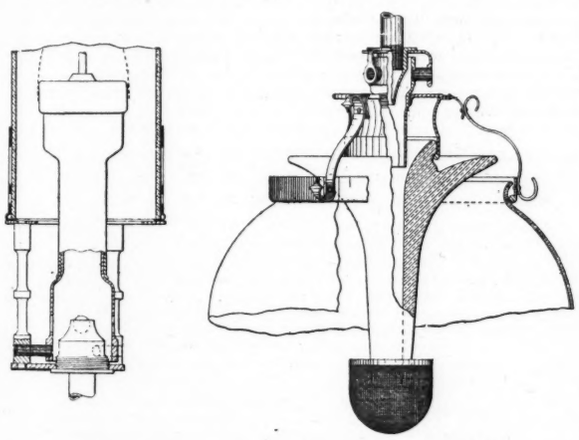
The bases of the pyramids may be oblong to conform to the shape of the hopper; and, instead of pyramids, cones may be used—made, if preferred, with oval bases.

Burners for Incandescent Gas Lighting.—Anderson, D., of Westcliff-on-Sea. No. 9367; April 23, 1904.

This invention has for its object to provide an improved anti-vibration burner.

The part which carries the gallery or support for the globe or chimney of the burner is fixed, and the burner proper and the supply thereto is (as shown) supported within the outer part by means of radial springs, flat or coiled or closely wound so as to form a resilient screw which bends under vibration of the parts which it connects—such resilient members being preferably disposed at the base so as to be protected from the heat of the burner.

The gallery for supporting the globe or chimney is carried at the upper end of a tubular casing, the base of which fits into a suitable base or support through which projects the gas-supply jet or nozzle. Within the tubular casing, and concentric with it, is disposed another tubular part supporting or forming at its upper end the burner proper, which carries the mantle-rod and mantle. The inner tubular part is increased in diameter or bell-mouthed at its base, and is suspended over the gas-jet so as to form the gas and air mixing chamber. The inner tubular part is suspended from the outer casing by radial springs or resilient screws, preferably disposed at right angles and stretching across the concentric space.



In applying the invention to an inverted burner, the outer casing is preferably made very open, or consists merely of arms carrying the gallery; while the depending tubular part, which supports the mantle and forms the burner, is supported at its upper and broadened out end from a ring or tubular member attached by means of radial resilient members (as described) from the gas and air mixing chamber, which is screwed or otherwise fitted to the gas-jet or supporting part. A concentric space may be arranged between this tubular casing or ring and the tubular projection from the mixing-chamber, so as to admit a further supply of air to the burner or depending tube with which the concentric space communicates.

Gas-Retorts.—R. Dempster and Sons, Limited, of Elland, and Scott, F., of Galashiels. No. 10,926; May 12, 1904.

The patentees remark that where a number of gas-retorts are heated by furnaces in a subway below the ground and difficult of access, "the subway is usually badly lighted and ventilated, and is not visible by the manager or foreman from the floor of the retort-house, so that rubbish often accumulates, and the conditions under which the stokers work are generally undesirable, and, moreover, there is a liability to accidents by scalding and suffocating in shallow subways from sudden dropping of clinker into the ashpans." To obviate these disadvantages, they propose to dispense with the roof of the subway, and obtain access to the mouths of the retorts by means of a travelling platform arranged level with the charging floor, and adapted to run along rails supported by angle irons bolted to the buckstays. For instance, where there are six arches filled with retorts, the travelling platform would cover the subway the width of about one arch; and for the length of the other five the subway would thus be open. The platform may be provided with anti-friction bearings, so that it can easily be moved from one arch or setting of retorts to another by hand power; or, if desired, racks and pinions or other gearing may be provided to enable the men standing on the platform to traverse it along the rails.

The arrangement referred to was described and illustrated in the "JOURNAL" for Aug. 23 last, p. 534.

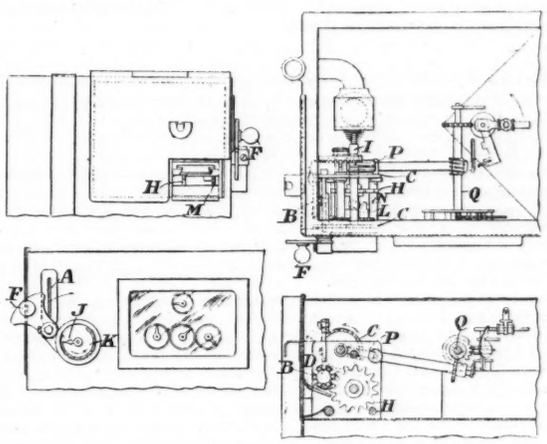
Extracting Tar and other Impurities from Crude Gases.—Everitt, W., of Ilkley. No. 13,316; June 13, 1904.

This invention—which has for its object the abstraction of floating tarry matter and other impurities from crude gases by means of a series of currents of intermittent steam admitted between iron wire screens, through which screens the crude gas is passed on its way to the condensing plant—was fully described and illustrated in a paper read before the Manchester District Institution of Gas Engineers last November—see "JOURNAL," Vol. LXXXVIII., p. 700. The patentee claims: 1, In an apparatus for purifying gas, a vessel containing screens and devices whereby the force of intermittent steam is utilized to cause the deposition of tarry matter on the screens; and 2, a vessel containing screens separated from each other by short distances and an arrangement of steam-ports whereby intermittent currents of steam are injected between the screens of varied angles with a vertical line drawn through the apparatus, but always at right angles to the flow of the gas current.

Prepayment Gas-Meters.—Metropolitan Gas-Meters, Limited, and Forster, J. D., of Nottingham. No. 13,557; June 15, 1904.

This invention relates to meters of the kind wherein the gas supply is shut off by a valve which is opened on the insertion of a coin.

The coin, inserted through a slot in the meter casing, falls into a carrier in the form of a lantern pinion, which is normally locked and gears with a toothed wheel adapted to turn a spindle which can move longitudinally in its bearings so as to close the gas-inlet valve and allow it to open under the action of a spring. The coin, when inserted into the coin-carrier, locks the latter to an external handle, by turning which the coin-carrier can be partially rotated so as to move the toothed wheel through a distance equal to one tooth, and thus turn the spindle to the same extent.



The illustrations show a side view of the attic of a meter, a front view, and a plan and section with the top of the attic removed.

The attic of the meter is provided with a coin slot A. B is the lantern pinion or coin-carrier, which is rotatably mounted in the frame C located in one corner of the attic of the meter. The bearing pin of the coin-carrier is held in an inclined slot D in the frame, and the other end of the pinion is made with a bearing hole into which passes the slotted end of a spindle, which extends through the meter casing and is provided with an external handle F, made in the form of a fan or quadrant so that when it is turned forward in the direction of the arrow it closes the coin-slot. The end disc of the lantern pinion is provided with a series of notches around its periphery engaging with a pin fixed to the frame C. The object of the pin and of the notches is to normally lock the lantern pinion against rotation.

H is the toothed wheel with which the pinion B gears; the wheel being keyed upon a spindle adapted to slide longitudinally in bearings in the frame. The inner end of the spindle bears against the stem I of the inlet valve to the meter, normally held open by a spring; while its other end passes through the meter casing and has keyed upon it a pointer J working over a dial K, indicating the number of coins inserted.

The spindle has fixed to it a projecting pin L, and loosely mounted upon it the toothed wheel M having a boss with the cam-face N adapted to make contact with the pin L. The toothed wheel M gears with the pinion rotatably mounted in the frame C and meshing with a pinion upon a spindle having a "change wheel," which is in connection, by means of the pinion P, spindle, and worm gear, with the two-foot shaft Q of the meter mechanism.

On a coin being inserted through the slot A (in the usual way), it falls into the lantern pinion B. The coin in this position also passes into the slotted end of the spindle, so that the external handle F,

keyed upon the spindle, is locked to the lantern pinion B. The handle is then turned in the direction of the arrow, and the pressure of the coin upon the lantern pinion causes it to ride up the inclined slot D, and thus releases the notch from the fixed locking-pin. The lantern pinion is thereby freed to turn with the handle; and in its movement it rotates the pinion H through a distance equal to the pitch of the teeth—thus turning the spindle through the same distance and bringing the pin L away from the curved projection of the cam surface. The coin then escapes from the lantern pinion and drops into a till. On the introduction of a second coin, the lantern pinion can be turned as before; thus again moving the spindle. In this way, the consumer can introduce the full number of coins the apparatus is made to receive, and each time the spindle moves the pointer moves with it, and indicates upon the dial the number of coins prepaid.

The flow of gas through the meter operates the two-foot shaft Q, and this, through the medium of the worm and toothed gear above referred to, rotates the cam wheel M in the same direction as that in which the spindle was turned when the apparatus was set by the introduction of the coins. As the quantity of gas for which prepayment has been received is gradually consumed, the cam N approaches and overtakes the fixed pin upon the spindle, and as the last coin's worth of gas is flowing through the meter it comes into contact with the pin and so pushes back the spindle, which gradually presses the valve-stem I against the action of its spring and so closes the valve, which remains closed until a fresh coin is inserted.

Desulphurizing Lighting Gas.—Maréchal, J., of Brussels. No, 28,765; Dec. 29, 1904.

The patentee proposes to remove the sulphuretted hydrogen from gas by means of ozone, either by causing the latter to act directly on the gas, by the previous causticizing of ammonia water, or by the simultaneous use of the two processes. The process of causticizing—*i.e.*, rendering active—the ammonia water by desulphurization and its application to the purification of lighting gas are, of course, already well known. This "improved process" chiefly consists in the use of ozone in the form of ozonized air.

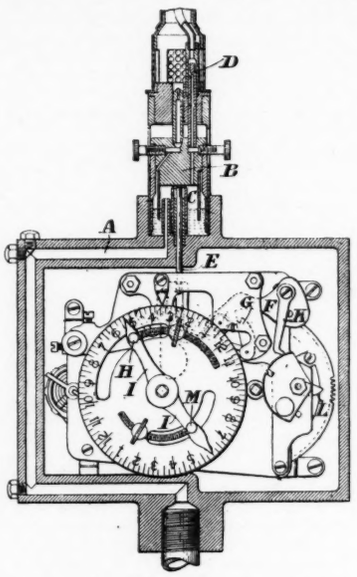
The ozone produced by the Siemens and Halske apparatus is conveyed into a column provided with discs, similar to a distilling column, which gradually receives the ammonia water to be desulphurized. The ammonia water thus treated gives off its sulphur in the shape of impalpable powder. The water is then collected and decanted into suitable tanks or reservoirs. The precipitated sulphur settles down and can be collected. The sulphur, when compressed, is said to be a very saleable article. The decanted ammonia water thus treated can be used for the purification of gas, by conveying it into the first compartments of (say) a "Standard," Kirkham, or other washer, where it acts in the usual well-known manner.

Regulating Mechanism for Gas-Lamps, which includes the Lighting and Extinguishing of Same.—Justice, P. M.; a communication from F. M. Gregg, of Cleveland, Ohio, U.S.A. No. 28,909; Dec. 30, 1904.

This invention relates to lamp-regulating mechanism—particularly to the class used for igniting and extinguishing gas-lamps. The object is to provide means whereby a suitable valve in the passage communicating with the source of supply may be opened and closed automatically, thereby controlling the supply of gas to the burner, and also to provide means for adjustably controlling the operation of the valve and the means for igniting the gas.

The lamp (as shown) is provided with a main burner and an incandescent mantle; the burner having the usual mixing-chamber with holes to admit air. Preferably the gas is ignited by a secondary burner or pilot light arranged within, or adjacent to, the main burner. Both burners (of the usual construction) communicate with the main supply pipe through a suitable passage A having a valve provided therein. It comprises, essentially, a small quantity of mercury or other liquid seal, which forms the valve seat, and a valve plug B having vertical movement with relation thereto. The mercury is contained in any suitable reservoir C, which may, if preferred, be formed integral with the casing of the regulating mechanism. The valve plug B has two concentric flanges; thus forming practically an inner and outer chamber. The outer flange is longer than the inner one, and is adapted to remain permanently submerged in the mercury; whereas the inner flange is adapted to be either raised or submerged by the movement of the flange. The outer and inner chambers communicate with the main burner, and the secondary burner or pilot light through separate passages; the latter provided with a secondary valve, so constructed that it will be opened when the valve plug is lowered and closed when it is raised. The gas from the main supply is first admitted to the inner chamber, and is thus caused to pass through the secondary valve into the pilot light when the valve plug is in its lowered or closed position, and to pass between the mercury and the inner flange into the passage leading to the main burner when the plug is in its raised or opened position. Suitable thumb-screws are provided in the passages both to the main and the secondary burners to regulate the amount of gas passing through them. The valve is automatically operated by a vertically movable member, such as a rod E, extending through the top of the casing. This operates against the lower side of the valve to raise it; and, in order that the valve may move uniformly and without binding, the vertically movable member engages the valve centrally, and so that it acts through its centre of gravity.

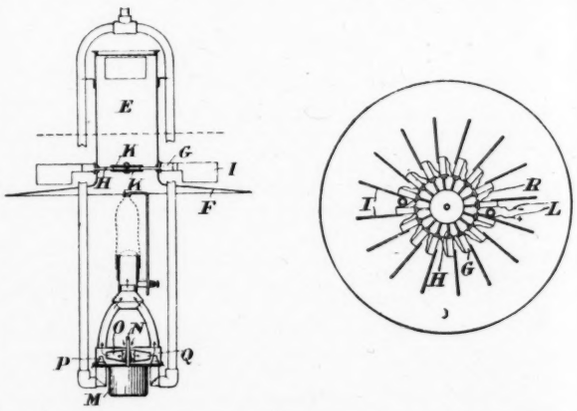
Assuming the parts to be in the position shown, the gas will pass from the main supply pipe, through the inner chamber of the valve and the secondary valve, to the pilot light. The valve being in its lowered or closed position, the inner flange enters the mercury or sealing liquid and prevents the escape of the gas to the main burner. Meanwhile, the outer end of the lever F is held in its raised or set position by the latch G until released by the tripping pin H on one of the pointers I. As soon as released, the inner end of the lever, under the action of a spring (which turns it about its centre) raises or opens the valve, which is held in its opened position by the detent engaging a slot in the extension of the rod E. The raising of the valve closes the secondary valve D in the passage to the pilot light and opens the passage to the main burner, which is lighted before the pilot light is extinguished. As the lever is released, the dog K is returned to its lowermost position by riding over the tumbler, if the segment should be raised by the clock, or over both tumbler and segment if the latter is at rest, where it remains until both notches register, which can only occur when the segments are in their lowermost position. The dog then engages the segment, and is raised to its set position by the next succeeding lug which happens to engage the spur L. This arrangement renders immaterial the number of lugs on the main spring wheel,



or the rate of their rotation, provided only that sufficient lugs be furnished to insure the lever being in its set position prior to the tripping of the detent. This is accomplished by the other of the adjustable pins, as M, which engages with the depending arm of the detent and disengages it from the slotted extension of the connecting rod E. The valve plug immediately drops by gravity; thus shutting off the gas to the main burner and opening the passage to the pilot light. Having thus accomplished their cycle, the parts are again in the position shown. The opening mechanism for the valve, it will be seen, is operated directly from the main spring of a clock, and not indirectly through the time indicating mechanism. For this reason "the clock will not become irregular, and the lamp will always be operated at the proper times.

Incandescent Gas-Lamps with Forced Air Supply.—Lucas, P., of Schoeneberg, Germany. No. 1280; Jan. 23, 1905. Date claimed under International Convention, Jan. 25, 1904.

Incandescence gas-lamps for intense light are known in which the mixture of gas and air is produced by a special fan, operated by a small electric motor. The present invention has reference to a lamp where the current for the operation of the fan is generated by the lamp itself, "so that a very uniformly burning gas-light of very great power is produced independently of any exterior source of power and without the structure of the apparatus interfering in any way injuriously with



the light, inasmuch as an unimpeded radiation of light can take place from the incandescence body in a horizontal direction and also in a downward direction." The lamp is composed of well-known parts—the loop-shaped gas-supply tube, the burner with the burner-head, the incandescent mantle, the chimney, and the reflector. The new device for the automatic supply of forced air to the lamp comprises two separate parts—namely, the source of power and the motor or

operating device. The source of power is constituted by a battery of thermo-elements, the construction of which is immaterial so long as it remains of constant action.

The thermo-electric battery consists, in the present instance, of radially arranged elements G, fixed at their inner ends to the chimney E or reflector F, and receiving heat through the radial heating pins H; while to the outer ends are fixed thin metal plates I for conveying away the heat by radiation, so that while the inner ends of the elements are heated to a certain degree the outer ends are kept cool—the inner end of one element being connected to the outer end of the next following element by a conducting wire R. The elements are arranged above the incandescence body, and their base constitutes the reflector.

In order to produce a uniform powerful heating of the pins only at their connections with the element, a cover K, consisting of an asbestos plate, is mounted upon the free ends of the pins in the centre of the chimney, whereby the hot combustion gases of the lamps are deflected laterally, and compelled to rise in the annular space between the asbestos plates and the chimney wall, so as to powerfully heat the pins near their connections with the elements. In this way, "a very excellent effect of the battery is produced." The current generated is conducted to the motor M by means of the conductor L and through the base of the lamp.

The motor is located in a casing mounted upon the base of the burner; the shaft N of the motor being provided with an upward extension for directly mounting thereon a fan O, which is arranged at a level with the gas-nozzles P, so as to force the air into a closed annular mixing-chamber Q.

When igniting the lamp, the suction produced by the issuing jets of gas is sufficient to carry along as much air as is required for starting combustion. The waste gases of the flame will immediately flow round the heating pins of the elements and set the battery in action. The motor then drives the fan, the working of which is so arranged and calculated that it forces a quantity of air into the mixing-channel around the gas-nozzles, "that will be reliably sufficient for the complete combustion of the total amount of gas admitted;" and the direction of motion of the current of air for combustion which is forced in insures the intimate mixing of gas and air before rising into the burner-head. By the arrangement of several conduits which lead from the lower mixing-chamber into the burner-head, an additional mixing of the combustible admitted to the burner is insured; and "an exceedingly quiet flame of very high heating power" is said to be produced, which "ensures a perfect efficiency of the incandescent mantle."

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The Institution of Gas Engineers and Gas-Testing.

SIR,—Mr. Irving, in his letter in your issue of the 18th inst., charges me with avoiding, in my letter the previous week, the main question of gas-testing, and states that he has neither the time nor the inclination to enter into any public correspondence upon the side-issues.

This decision on the part of the President of the Institution I regard as unfortunate, seeing that the object of my letter was not to discuss the question of gas-testing, but simply and solely to direct attention to what appears to me to be an irregular proceeding on the part of the Council.

The recommendations of the Board of Trade have, the President states, been considered at two general meetings of the Institution. This is just my point. It is these two discussions, of which I had neither notice nor knowledge, that I complain of.

When an expression of the opinion of the Institution, and a vote is to be invited on an important matter such as this, respecting which there is diversity of opinion—notwithstanding the President's pronouncement of unanimous and emphatic condemnation—I submit that every member is entitled to due and proper prior notification.

I would further add that the President is, in my opinion, the last man in the Institution whose attention it should be necessary to direct to a matter of this kind.

ISAAC CARR.

Widnes, April 20, 1905.

Gas Associations and Commercial Sections.

SIR,—As, unfortunately, an important business appointment prevented me from accepting the President's invitation to attend the Eastern Counties Association meeting on the 13th inst., perhaps you will allow me to add to the discussion a few remarks which may be of some small use in enabling the Committee of that and other Associations to make up their minds as to the advisability of at once energetically taking up this important branch of the profession.

I was not at all surprised that the main topic of discussion was as to the value of such a Section with regard to coke, because after all it was this and other residuals that originally brought the Manchester Committees into being, and even to-day the stocks, value of and state of the market for this commodity takes up the position of "hors d'œuvre" at a dinner and is invariably discussed at every meeting. The other residuals, &c., always come in like the dainties, each in its season. But to this has been added other matters of equal importance to the progress of our undertakings—the subject often being suggested by one of the members, but, if not, arranged for by the Committee. Among these, I may mention a few—viz., "The advantages and otherwise of various methods of contracting for the sale of bye-products;" "Maintenance of domestic incandescent lighting;" "Conditions of employment and payment for different classes of labour;" "Rates and taxes;" "Hiring or otherwise of cooking-stoves, &c.;" "Possibilities of competition from suction or other producer plants, and how this is to be met"—which have already received attention. But the possibilities of the future are like the views from a mountain—the higher one climbs, the more one sees and the wider the outlook.

I may mention also that such a difficulty as that mentioned in regard to waggons also comes within the work of such a Section. Indeed, this very question itself was taken up in the Manchester District, and the difficulty was considerably reduced by consultation between the representatives of the Railway Companies and the Committee of the Manchester Sub-Section.

I do not wish to further trespass upon your space, although one would like to, but will simply say in conclusion that any assistance or information which any District Association would like in connection with this departure from their orthodox lines, I am sure the Manchester District Institution of Gas Engineers' Commercial Section will be only too happy to afford.

S. MEUNIER.

Stockport, April 21, 1905.

The Spencer Grid.

SIR,—Having regard to the publicity which has been given to the Spencer grid in the illustrated article appearing in your last issue, perhaps we may be permitted to say that we are advised that this grid is an infringement of the patents we hold in connection with the Jäger system, and that our Solicitors, acting on our instructions, have already placed themselves in communication with Mr. Spencer and the Elland Gas Company.

SAML. CUTLER AND SONS.

Millwall, E., April 19, 1905.

A "Patent" Retort-Scurfer.

SIR,—I was amused at reading an advertisement in the "JOURNAL" dated Dec. 20, 1904; but, as I have not seen many of your issues of late years, perhaps it has appeared before. It was an advertisement of a "patent" retort-scurfer.

If you will refer to the Gas Institute "Transactions" for 1882, p. 231, you will find a description of a scurfer that I had used and made myself both in England and out here, at several works, with the same success as I stated in my description of 1882. How the firm whose advertisement I refer to can call it their "patent," licks creation.

SAMUEL RUTTER, Engineer and Manager.

Wellington (N.Z.) Municipal Gas-Works, March 9, 1905.

Devonport Gas Affairs.

SIR,—At a recent meeting of the Devonport Corporation, held to consider the report of the Gas Committee, Mr. P. C. Goodman was reported in the local Press to have used (in reference to a meeting of the Gas Committee at which he himself was not present) the words "when I am told there were £5 notes."

As this statement appeared to suggest improper conduct on the part of contractors, and as the report of the Committee was in favour of the acceptance of a tender by our clients, Messrs. Samuel Cutler and Sons, we placed ourselves in communication with Mr. Goodman. We are pleased to say that we have received Mr. Goodman's assurance that he had no thought of connecting Messrs. Samuel Cutler and Sons with the matter.

BLYTH, DUTTON, HARTLEY, AND BLYTH.

112, *Gresham House, E.C., April* 20, 1905.

Gas Explosion at Birmingham.—A violent explosion of gas occurred at Birmingham at five o'clock on Friday evening. The effect was that the whole of the front of a screw and bolt factory in Sherborne Road was blown into the roadway, and with the collapse of the front the four floors fell. Fortunately work was not proceeding at the factory, but half-a-dozen people were engaged in carrying out repairs on the premises. At the time of the explosion they were at the back; but four of them were seriously injured by the flames and the shock of the explosion. It was not known, when the report was dispatched, how the explosion was caused; but it seems certain that gas must have been escaping since the works were closed on Thursday evening.

Gas versus Electricity at Torquay.—A discussion of considerable interest took place at the last meeting of the Torquay Town Council with reference to the electric light undertaking. Mr. Luxmore moved that a Special Committee be appointed to obtain information as to the advantages and relative cost of gas and steam engines for the generation of electricity. He contended that gas not only cost less, but was cleaner and in other ways more suited for the requirements of a place like Torquay. Mr. Pike, supporting the motion, said that if they had gas-engines they would not need the proposed tall chimney at the new electricity works. Mr. Wills thought the motion was a roundabout way of passing a vote of censure on the Electrical Committee. Mr. Taylor said coal gas would be too expensive for their purpose. He believed that out of 349 electric lighting concerns 17 used producer gas, and only one of these was equal in size to Torquay. Moreover, the use of gas was practically impossible with an alternating current. Mr. Luxmore protested against the idea that his resolution was a vote of censure, but the Council rejected it by twelve votes to six. In another resolution, Mr. Luxmore invited the Council to determine that the price of the electric light be fixed at such a rate as would produce a minimum net profit of 1½ per cent. on the capital employed, after providing 6½ per cent. for the payment of interest and sinking fund. He contended that the undertaking should be so worked that any loss which was incurred would fall on the consumers, and not on the ratepayers. Mr. Taylor argued that, though in moving the electricity works there would be a loss, this would not fall on the ratepayers. In six years they had accumulated a reserve fund of £400; and he did not think there was any fear of the undertaking being a burden to the ratepayers. This resolution was also rejected.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Monday, April 17.

THE RATES IN LONDON.

Mr. BENN asked the President of the Local Government Board how the increase in the average rate in the pound levied by the Metropolitan Boroughs compared with the increase in the average rate, exclusive of education, levied by the London County Council.

Mr. GERALD BALFOUR said that, taking the three years ended March, 1904, the increase in the average rate levied by the Borough Councils in the Metropolis for their own purposes was 1d. in the pound. In the case of the London County Council, the increase was 1½d. No sum was raised by the Council for education purposes.

Mr. BENN also asked the President of the Local Government Board what was the amount of the increase in the average rate in the pound levied by the Metropolitan Boroughs during the four complete years of their existence, as compared with the average rate levied by their predecessors, the Vestries and District Boards, during the like preceding period.

Mr. GERALD BALFOUR: The returns received by the Local Government Board do not enable me to include the year 1904-5 in the period in respect of which the information asked for is desired. The average rate in the pound of the Metropolitan Borough Councils in the three years ended March, 1904, was 1s. 10·6d.; and the average rate of the Metropolitan Vestries and District Boards and the Woolwich Local Board of Health for the three years ended March, 1900, was 1s. 7·1d. The increase, therefore, was 3s. 5d. For the purpose of the comparison, I have taken the rates raised by the Vestries and District Boards as including those required for the expenditure of Burial Boards, Commissioners of Baths and Washhouses, and of Public Libraries and Museums, whose powers have now been transferred to the Borough Councils.

Sir G. BARTLEY asked whether it was not the fact that during the same period the assessment in many cases had been enormously increased—that the same property was now assessed at a much higher rate than it was—and that therefore the absolute rate in the pound was somewhat misleading.

Mr. GERALD BALFOUR replied that he thought this was probable.

Tuesday, April 18.

THE RATEABLE VALUE OF LONDON.

Mr. CLAUDE HAY asked the President of the Local Government Board whether he would give the total rateable value of the County of London; the proportion of it represented by railways, limited companies, and other bodies not entitled to vote; and the proportion represented by persons who compound for their rates.

Mr. GERALD BALFOUR said the total rateable value of the Administrative County of London, according to the valuation lists which came into force on April 6, 1905, subject to appeals, was £41,657,244. A statement published by the London County Council showed that the rateable value of railway property in the county, according to the valuation lists which came into force on April 6, 1901, was £2,307,864. The Local Government Board were not in a position to give the other particulars asked for.

The only further progress made with Bills down to the rising of the House on Wednesday for the Easter recess was the second reading and committal of the Hessle Gas Bill.

The Outbreaks of Fire at Messrs. Sugg's.—The cause of a remarkable series of outbreaks of fire at the works of Messrs. W. Sugg and Co., Limited, in Westminster, which followed the serious conflagration on the 17th ult., which damaged the premises to the amount of about £40,000, as well as of that disaster itself, appears, from an account contained in a recent number of the "Weekly Dispatch," to have been the work of an incendiary, who was captured, at considerable risk, by the police, and is now confined in Colney Hatch Asylum as a dangerous lunatic. The man, who is about 20 years of age, is named Joseph Inwood, and a former employee of the firm, who had been discharged for incompetency and laziness just before the first fire; and he was traced by means of his handwriting in some anonymous letters which his sister had posted for him to the firm. On his arrest, his mother said he was always talking about the fires at Messrs. Sugg's, and saying how much more he meant to do to show them what he was. It has been ascertained that on the nights of the fires Inwood was absent from home.

Primitiva Gas and Electric Lighting Company of Buenos Ayres, Limited.—The Directors of this Company, in their report for the year 1904, state that the balance of revenue account and the interest received from the German Transatlantic Electricity Company amounts to £115,386; making, with the balance brought forward, a total of £132,071. Deducting debenture interest, £23,665; interest, discount, and commission, London expenses, fees of Directors and Trustees, income-tax, and depreciation on furniture, £8937; two dividends each of 2s. 6d. per share (free of tax) on the issued preference shares, and making reserve for dividend on preference shares still to be issued, £40,000; sum written off towards amortization of the item "discount on debentures," £4000; and the amount placed to the general reserve account, £15,000, there remains to the credit of the profit and loss account a balance of £40,469. The Directors recommend a dividend of 6s. per share (tax free), equal to 6 per cent. for the year, on the ordinary shares, which will absorb £24,000, and leave £16,469 to be carried forward. The increase in the sale of gas last year amounted to 4½ per cent.; and there was considerable extension in the use of cookers and stoves.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Eighth Day.—Tuesday, April 18.

(*Before Mr. Justice* GRANTHAM.)

Graham, Morton, and Co., Limited v. Compagnie L'Union des Gaz. The Milan Gas-Works Contract.

The hearing of this important case was continued to-day.

Mr. RUFUS ISAACS, K.C., Mr. J. A. SIMON, and Mr. A. M. PADDON (instructed by Messrs. Spyer and Sons) appeared for the plaintiffs; Mr. J. A. HAMILTON, K.C., and Mr. A. H. SPOKES (instructed by Messrs. Waterhouse and Co.) represented the defendants.

FURTHER EVIDENCE FOR THE DEFENDANTS.

M. *Jules Freyss*, who gave his evidence in French, produced a number of photographs taken of various parts of the furnaces, the beds, and the gas-producers, which showed the damage done by the enormously high temperature at which they had been worked. Some masonry on each side of the producer, said witness, was faced with red bricks instead of fire-bricks; and each place where the red bricks existed was marked on the photographs with a cross.

Mr. ISAACS: These are filling-in bricks.

Mr. SPOKES (to witness): Were these filling-in bricks?

Witness: Yes. There were many pieces of brick there, and in the greater part there was no mortar between them. There should have been regular masonry in the place indicated. There was also a defect in the oven in bed No. 4, in which, instead of a nostril, there was an air-hole which ought not to have been there. In another photograph it was shown clearly that instead of there being four gas and air canals placed in the proper order—viz, first gas, and then air—the two air canals and the two gas canals were placed together. The nostrils were not very symmetrical, and there was a narrowing of the interior, which made it very easy to become filled with *débris*, and very difficult to clean. All around the gas-producers and the carbon monoxide duct there should have been fire-brick; but instead of this there was nothing but red brick. In bench No. 4, it was shown that the filling-in materials behind the carbon monoxide duct and between the regenerators, were composed of ordinary red brick, placed vertically and without mortar. In this part there should have been highly refractory materials; but, in any case, the masonry was not well made. Another photograph showed very wide intervals between the bricks, and that there was practically no bonding with mortar. This part of the masonry was not fluxed, so that the mortar could not have run—in fact, it was never really there.

Mr. ISAACS at this point complained that all these particulars were not put to his witnesses. The photographs were being supplied to him as they were produced. It might be that he should have to put them all to his witnesses.

Mr. SPOKES admitted that his learned friend would be entitled to do this.

In further examination, witness said there ought to have been fire-bricks right up to and behind the vertical part of the carbon monoxide duct, instead of which there was only ordinary red brick. In another bed there was detestable masonry, consisting mainly of rubble; while the bricks were placed on edge. Here there was also bad laying of bricks, which were placed in all directions, and could not be said to be bonded at all. He thought the masonry was laid in a very negligent manner, many of the joints being without mortar. In one of the ovens there was great heat in the lower part of the oven, which had caused a large crack in the walls. In another place there were 12 or 13 courses of bricks in the division walls between two ovens which were not interlocked at all, and in which there was no bonding. The result of this was that when the oven became hot the masonry expanded, and when it cooled it contracted; the effect being that cracks were produced. Some of the nostrils were very much wanting in symmetry; and this made it difficult to clean them. In fact, it was impossible to do this properly, as some parts were quite inaccessible, even with appliances made for the purpose. This statement applied to all the nostrils. Asked if Mr. Leech, or any one representing Mr. Graham, was able to show him how to clean them, witness said he never spoke to them about it. The construction of the ovens caused a greater draught to go into the lower than into the upper chambers; and this caused an unequal distribution of both the heat and the gas.

MORE PICTORIAL EVIDENCE.

A large coloured drawing, to show the meaning of witness's evidence, was here placed on the wall; and, by pointing to the various portions of it, witness made his meaning clear. It was explained by Counsel that the drawing had been made to scale, and had been prepared by Mr. Marshall, an expert of the defendants.

In answer to further questions, witness said he had taken the temperature of the upper and lower chambers, and it varied from 875° C. to 1080° C.

Mr. SPOKES: Is it possible, by any manipulation of the dampers, to prevent the intense heat in the lower chamber.

Witness: No; you can change the general temperature of the higher and the lower chambers, but it is impossible to change the proportion of the heat by means of the dampers.

If you change the temperature at all, does it change the temperature of one set of chambers?—Yes; but there will be the raising or the lowering of them all.

You can increase or diminish the heat of all the chambers; but you cannot get rid of the disproportion of heat?—Yes.

Witness next pointed out, in another photograph, a nostril of an

extraordinary shape, in which the elbow was quite rectangular, with no symmetry between the right and left nostrils. The left one went down farther than was necessary, while the nostrils were not in the same vertical plane. Witness said he saw these nostrils himself, and they were accurately represented in the photograph produced. This method of construction made it impossible to clean the nostrils as they should be cleaned. There were other nostrils of an uneven character, which also made it difficult to clean them. The plan of the nostrils showed an extraordinary method of construction, and they also differed a good deal from the plans of Mr. Graham. Witness next produced plans of nostrils which were shown to Mr. Herring at Milan, and which represented the passages with elbows absolutely at right angles. There was also a drawing which showed how impossible it was to get a bar along the passage to clean it.

Some conversation here took place between his Lordship and Counsel as to the necessity for going further through the photographs. Mr. Spokes suggested that he should give Mr. Isaacs copies of the photos.; and his Lordship thought this was a good suggestion. Upon consultion with his clients, however, Mr. Spokes found that this would not do; so the further examination by means of the photographs was proceeded with.

Mr. Isaacs said his Lordship would remember that the photographs did not always show, as they should do, the full extent of a passage, on account of the projecting bricks and planks, &c.

Justice Grantham said he would bear this in mind.

In further examination, witness said that in one wall in bench No. 5, Mr. Graham had entirely forgotten to make nostrils at all, and they were made by masons belonging to the defendants. They were not made in his presence; but when the ovens were demolished, he saw nostrils of a very irregular character, and asked about them. He was told that they had been forgotten, and were made subsequently by the defendants' masons. They had to be made from above; and this was a very difficult thing to do. It was not possible to make good nostrils in this way. Witness produced another photograph, of bench No. 7, in which he said the heat in some of the chambers was quite inefficacious, while the stripes in the retort also showed unequal heating.

Mr. Spokes: Is the fluxing in the lower chambers in your opinion due to bad working of the men?

Witness: No.

What have you to say as to the producer?—The dimensions are very small, and soon after beginning to work with them the grates were changed by the Engineer. The distance between the horizontal grate and the lower part of the carbon monoxide duct is very small. When work is begun with these ovens, at first there will be a normal composition of the gases coming from the gas-producer; but seeing that the carbonic acid gas which is formed above the grate has not the means to transform itself into carbon monoxide, as there is a high temperature, clinkers will form, and the fuel will become insufficient to perform the work properly.

In answer to further questions, witness said the producers were clinkered every 16 hours. He made analyses of the gases in the oven of bench No. 4 on the 25th and the 29th of June. The former day, he found in the left regenerator 17 per cent. of carbonic oxide and 2 per cent. of oxygen; and in the right regenerator, 15 per cent. of carbonic oxide and 3 per cent. of oxygen. This was normal, and showed that the carbonic oxide had been burned and had become carbonic acid, and that only a small residue of oxygen remained. On the 29th of June, the left regenerator showed 8 per cent. of carbonic oxide and 12 per cent. of oxygen; while the right one had 9 per cent. of carbonic oxide and 11 per cent. of oxygen. This proved that only 8 per cent. of carbonic oxide had been burned, and that the oxygen remained. Between the dates mentioned, the dampers had not been touched at all, but remained as they were found. The result showed that the ovens were working with a considerable excess of air, because the duct of the canal had become obstructed, and prevented the carbon monoxide going into the ovens properly. On the 30th of June, the obstruction was removed, and the result was that they got 15 per cent. of carbonic oxide and 3 to 4 per cent. of oxygen.

Mr. Spokes: It is suggested that, by clinkering more frequently, you can get rid of the tendency of the carbon monoxide duct to be stopped up.

Witness: Yes; if the clinkering takes place at much closer intervals. But it is not practicable, because each clinkering causes a disturbance of the temperature of the ovens. We were compelled to use as much draught as we did because the carbon monoxide duct had such a small section, and on account of the small sections in the whole construction of the ovens. We were obliged to create this draught in order to work the ovens at all.

The Question of the Heats.

In further examination, witness said he had made experiments to show that bye-passing took place through the division walls of the regenerators. He produced a table which set forth the results.

Mr. Spokes said these tables showed that there was more oxygen at the bottom of the exhaust flue than at the top, which meant that the oxygen of the air had got through the division walls into the exhaust chambers. (To witness:) Do these analyses of yours show that there was bye-passing?

Witness: Yes.

Are there any other signs?—Yes; I saw some fissures in the regenerator, at the time of demolition, which also showed bye-passing.

Is it possible, in any case, to reach the apertures in the nostrils?—Absolutely impossible, when the ovens are at work.

These defects caused the unequal heating?—Yes.

Might they have been decreased to some extent if the mouths of the nostrils had been graduated?—Yes; the upper chambers should have had the larger apertures.

And in the graduation that exists are the holes the opposite way to what they should be—that is, the largest apertures are at the lower instead of at the upper chambers?—Yes.

Another table was produced showing the heats in various parts of the ovens; and they demonstrated, it was said, that the heat was greatest in the upper part of each set of chambers.

Mr. Spokes: Was it possible to go on using these ovens, or was it necessary to demolish them?

Witness: It was impossible to go on using them. Owing to the arrangement of all the different parts of the ovens, and to the state in which they were found when demolished, it could be said that these ovens could not be properly regulated.

It was said that the carbon which was produced in Court was due to the bad working of the ovens?—No; that is not so.

It is said that it was because of back-pressure?—I do not think the pressure in the retorts was ever very high.

Was the absence of enough pressure due to bad construction or to bad working?—I do not see what the construction of the ovens has to do with the interior of the retorts.

Has the existence of carbon anything to do with the fusing?—No.

Cross-Examination of M. Freyss.

In cross-examination by Mr. Isaacs, witness said he had had experience with ordinary gas-retorts since 1894, and had had some experience with inclined retorts before he went to Milan last year. He had never directed or supervised the construction of inclined retorts; but he had travelled and studied the building of gas-ovens in various parts of the Continent for the defendants. Witness was called in to reorganize the new service at Milan, and Mr. Bourne, who was Resident Engineer at the time, left.

At this point witness was asked if he could see Mr. Bourne in Court; and he said he could not, but that he thought he had seen him there previously. On being pressed by Mr. Isaacs, the witness, looking round, said he did see Mr. Bourne present.

Cross-examination resumed: Mr. Bourne continued the direction of the works after he arrived. He (witness) reached Milan in January, and he thought Mr. Bourne left in March. He was expressly directed to go to Milan.

Mr. Isaacs: Before you went, did you know of the reports in writing that had been sent home from Milan and Paris to London?

Witness: Very little. I had scarcely occupied myself with the Italian works at that time.

Did you not know that Mr. Green had been sent out to inspect the installation in November, 1903?—No.

Did you know that the retorts had been at work from the end of 1902?—Yes.

In further cross-examination, witness said that he did not know Mr. Corbet Woodall; but he saw him later on. He remembered Mr. Green speaking to him about Mr. Woodall having inspected the works in November, 1902. He (witness) knew how long the beds had been working when he examined them; and he thought bench No. 4 was better than the others.

Mr. Isaacs: In the construction of a setting of this character, is it not usual that the filling-in is not supposed to be so permanent as the piers and the rest of the construction?

Witness: Evidently not. A good oven should last for some 1000 or 1100 days.

Did you ascertain how many days the beds you examined had worked?—Yes.

Beds Nos. 6, 7, and 8 of bench No. 4 had actually worked for about 609 days when you examined them. Did you know that?—I did not know then in such detail.

In further cross-examination, witness said he looked in the Company's books to see how much coal these beds had carbonized; and possibly he knew they had done 5600 tons per bed. He found fault with the principle on which this construction was made, and objected to nearly the whole of it. According to his view, ovens constructed on this principle were not satisfactory. He had examined the designs, and found fault with the principle of them. The work was constructed in great part according to the design.

Mr. Isaacs: Apart from the gas-producer, what is wrong with the system?

Witness: I think that the carbon monoxide duct is too small, that the design of the nostrils is defective, that the sections of the walls between the retorts are too small, that the gas distribution in the setting is badly apportioned, and that the regenerators are constructed so that they cannot be very effective.

According to your criticisms, the furnaces could not work properly?—No.

That was obvious to you at the first, I suppose?—It was to be seen after the demolition commenced.

When you looked at the drawings, did you at once conclude that they were not satisfactory?—No; not at once. I considered the furnaces were too small, but thought a larger one might work well. I saw, however, that the carbon monoxide duct was too small, as it gave such a small section to the passage of the gas.

Did you know Mr. Green had seen the drawings, and had reported that the installation was working splendidly?—No.

Or that Mr. Bourne, who had had charge of them from the time of their construction, had made a similar report?—I only learned that about a month later, after I had made combustion experiments.

What are the points of which you complain with regard to the materials or the workmanship?—The refractory materials are made almost of pure silica, and silica has the defect that it expands considerably, so that when the walls expand the retorts crack at the places where they are surrounded by them. The walls were of refractory materials, but the filling-in was of non-refractory material; and there were places where they were bound to flux. The masonry was extremely badly made—made in a most neglectful fashion.

Was that not neglect which a competent engineer ought to have seen at once?—Yes; by paying close attention to the works.

Was Mr. Bourne a competent engineer?—I had not sufficient knowledge of him to say. He was reckoned to be one.

Was Mr. Bourne present when these installations were worked before you?—Yes.

Was a part of the refractory material employed in the construction of the works used again in the reconstruction?—Perhaps it was used as filling-in.

Do you mean because it was not good enough for refractory material?

—No; but a good deal of that which came out of the settings was completely fluxed.

Were you present at the reconstruction by M. Derval?—Partially.

Did M. Derval examine the materials before he made his contract with the Company?—I believe so.

Do you know that he reported as follows: "The refractory slabs and bricks formerly used in the construction of the regenerators can to a considerable extent be used again, for we have every reason to believe they are of excellent quality. The same remark applies to other refractory material used by Messrs. Graham, Morton, and Co." ?—I have no knowledge of that letter.

Did you not know that M. Derval contemplated using some of it?—I think there was a question of using some of it for filling-in.

Had you at that time formed an opinion that the material was not good?—No; when I said that the refractory material was not good, I meant in the walls around the retorts.

If you thought it was bad, and you knew M. Derval was going to use it, why did you not tell your Company it was bad?—They did not use the bad material except for filling-in.

At this point, the further hearing of the case was adjourned until Wednesday, the 3rd prox.

THE OMAGH ARBITRATION AWARD.

In the King's Bench Division of the High Court of Justice for Ireland, last Wednesday, before the Lord Chief Justice and Justices Andrews and Gibson, the question of the award in respect of the recent purchase by the Omagh Urban District Council of the Omagh Gas-Works came before the Court for review in the case of *The King v. Joshua W. Edmundson*. It was an application by Mr. Michael Lynch, the Chairman of the District Council, to have made absolute a conditional order of *certiorari* to quash the award made by Mr. Joshua W. Edmundson, of Dublin, the Arbitrator, who fixed the price to be paid by the Council for the gas-works. The facts have already been recorded in the "JOURNAL." Mr. Edmundson was appointed under the 76th section of the Act of 1901, which contains a provision that if the parties interested in a purchase failed to agree as to the price, the matter was to be referred to arbitration. The Omagh District Council and the Gas Company, after having been in negotiation for some time, were unable to determine what would be an equitable price for the undertaking; and accordingly, on the nomination of the Commissioners of Public Works, Mr. Edmundson was called in. He held an inquiry, and evidence was produced to show that the income of the Company averaged about £1200 a year. Having fully heard both sides, Mr. Edmundson made his award, and fixed the price of the plant, goodwill, &c., at £26,800. The Council contended that the award was bad, and that it was made without, and in excess of, jurisdiction, as he had valued the undertaking with statutory powers attached.

The arguments were opened for the Council by Mr. S. Ronan, K.C., who said the point involved in the case was a very short one, but nevertheless one of considerable importance. His clients sought to have the award set aside on the substantial ground that it was bad on the face of it. Prior to July, 1901, there had been in Omagh a private partnership not invested with any statutory powers, which supplied gas to the town. The population of Omagh was 4700; and he felt bound to say that it was enough to make one's mouth water to think that, as the result of its prosperity, the right to supply gas to some 4700 men, women, and children should be valued at so large a sum as £26,000. They were not, however, going to deal with this figure now, though, no doubt, it explained why the District Council were dissatisfied with the award. When in 1901 the Company sought powers in Parliament, the Council endeavoured to oppose their efforts to get a Bill passed. The Company then threw out the suggestion that the Council should buy them up; and the latter, when it came to be a matter of discussing terms, insisted that the value of the undertaking should be determined on the basis that the Company had no statutory powers. The contention now put forward by them was that the Arbitrator valued the undertaking as if the Company had these powers; and having done so, they said his award was bad. Nothing had been done under the award. The Company still remained in possession, and refused to let the Council take over the business. There had been no attempt made to enforce the award; but the Council had resorted to the present legal method of getting a decision on the matters in dispute.

Mr. J. Gordon, K.C., M.P., contended, on the part of the Gas Company, that the award was good and could not be assailed. The reason of the delay and of no proceedings having been taken, was that it was agreed by all parties that the Council should get four months' extension of time to pay the amount. All the witnesses who were called before the Arbitrator gave their testimony on the assumption that the Company were a non-statutory body, and that they were not to be paid for any extra value that could be given to the undertaking by any Act of Parliament if passed into law. Mr. Gordon submitted that if the Council wished to challenge the award, the proper course for them to adopt would be to traverse it, and seek to have it set aside in the mode which the Act of Parliament provided.

The arguments, which extended into Thursday, were resumed by the Solicitor-General (Mr. J. H. M. Campbell, K.C.) who, following up Mr. Gordon's contention, submitted that, having regard to what was laid down by the Acts of Parliament, it would be impossible to maintain that the Arbitrator had gone beyond the limits of his jurisdiction. The Acts under which he sat prevented him from dealing with any question of value incident to the statutory powers; in other words, the whole undertaking and everything connected with it was the subject-matter of compensation. There was a proviso, however, that the Arbitrator, in fixing the compensation, was not to give anything by way of consideration of the Company's statutory powers. The Arbitrator had himself recited these Acts in making his award. The Court must therefore assume that he knew the extent to which his jurisdiction went; and, unless there were satisfactory proof given to the contrary, they must not lightly assume that he had acted in excess of that jurisdiction.

The Court reserved judgment.

GUILDHALL JUSTICE ROOM.—Thursday, April 13.

(*Before Alderman Sir* JOHN BELL.)

Star Inverted Incandescent Burner Company, Limited, v. Norden.

Charge of Selling Goods Bearing a False Trade Description.

To-day the hearing was commenced of two summonses taken out by Mr. Harry Maisner, the Managing Director of the Star Inverted Incandescent Burner Company, against Mr. Julius Norden, of the United Chemical Works. The first was for having on March 28 unlawfully sold certain goods—inverted incandescent mantles—to which a false trade description was applied; and the second for having such goods in his possession on April 1. Defendant entered a plea of "Not guilty," and it was agreed to take the second summons first.

Mr. BODKIN (instructed by Mr. Jonathan E. Harris) appeared for the Star Burner Company; Mr. HORACE AVORY, K.C., and Mr. BIRON (instructed by Mr. J. T. Davies) represented Mr. Norden.

Mr. BODKIN explained that the prosecution had been instituted by the Star Inverted Incandescent Burner Company, Limited—a Company which was registered in 1903 for the purpose of acquiring and working a patent and for acquiring and selling goods of a registered design under the Patents, Designs, and Trade Marks Acts. The Company acquired the patent of a German named Ahrendt—No. 5977 of 1903—for "Improvements in Inverted Incandescent Gas-Burners." Now the mantles used with inverted burners were made of the same materials as the others; but instead of being suspended on a fork, they were tied round collars made of china clay. These collars, according to the registration of the design which he would come to in a moment, were provided with two ears or clips, which fitted into two slots in the burner. The invention of Mr. Ahrendt was vested in a Mr. Altmann, who sold it to the prosecuting Company. But as well as acquiring the patent rights in the burner, Mr. Altmann registered under the Patents, Designs, and Trade Marks Act of 1883 the particular form of mantle, with these two clips, which alone would fit the Ahrendt burner—the number of the registered design being 427,544—and this registered design also became the property of the Company. It was their practice—just as he believed in the old days it was the practice of the Welsbach Company—to sell together burners constructed according to the patent and mantles constructed according to the registered design; and the mantles were sold for use with these patented burners, and not for use with any other. The price they charged was 54s. a gross for the mantles, which were originally made in Germany, and subsequently, to a considerable extent at any rate, in this country. All the mantles bore on one side of the clay top the words "Made in Germany," and on the other "Registered No. 427,544." They were sold in white boxes having on the top "The Star Inverted Mantle." The inverted burners other than Mr. Ahrendt's were so arranged that the mantle was suspended by three prongs, instead of two as in his case; so that the two-clip mantles were recognized in the trade as being adapted only, and sold only, for the Ahrendt burner. There could not be a shadow of a doubt that the defendant—who traded in incandescent goods at No. 94, Leadenhall Street, as the United Chemical Works, Julius Norden and Co.—knew perfectly well that the two-clip goods of the prosecuting Company were the subject of a patent and also of a registered design. It came to the knowledge of the Company during April of last year that there were a number of infringements extant; and after inquiries had been made, correspondence followed between them and the defendant. Learning that defendant intended to make an inverted mantle similar to theirs, the Company wrote pointing out that this mantle was registered both in England and on the Continent; but they offered, if he wished to become an agent for the mantle, to quote prices. In answer to this, defendant said that his firm received inquiries from time to time for inverted mantles, and they therefore proposed to manufacture them in the same way as they did other shapes and sizes. He intimated that they made inverted mantles many years ago, and asked: (1) Whether the Star Company had any patent rights in England or Germany which his firm would be infringing simply by the manufacture of inverted mantles as such; (2) whether the Company would supply his firm with the mantles at such a price as would enable them to sell them at a profit; and (3) whether, if the Company did not make their own mantles, they would give his firm an opportunity of quoting for the supply of quantities to them. The answer of the Star Company was: (1) Their mantle was protected in Germany and England; (2) they would be glad to quote special prices for quantities; and (3) they made their own mantles. At the same time, the Company admitted that defendant could make inverted mantles of any other pattern than theirs. This correspondence was a friendly warning to a rival that he might make as many inverted mantles as he pleased, selling them at what price he chose, but he must not imitate the shape and description of mantle which was the property of the Company, and the subject of a registered design. Hearing later that there were still infringements on the market, the Company made further inquiry, with the result that on March 28 this year a Mr. Ball was requested to go to defendant's premises for the purpose of purchasing some mantles. He went, asked for some Star mantles, and was served with, among others, half a gross of the two-clip mantles, for which he paid at the rate of 48s. per gross, less 2½ per cent. They were in brown boxes, marked "Two Clip" (which was the form in which the Company's mantles were known), and had on one side "Made in Germany," and on the other "Registered No. 427,544"—in exact imitation of the Company's mantles; but there was a difference which showed they were not the Company's manufacture. Upon this a search warrant was applied for, and was executed by the City Police on April 1. At Leadenhall Street were found about 18 dozen mantles having round the rim "Made in Germany," and the registered number (427,544), and about 17 dozen unmarked. After the proceedings were taken, defendant's Solicitor wrote to the prosecutors' Solicitor stating that the two-clip rings were obtained from the Magnesia Company of Berlin; that defendant fully believed these people were entitled to supply them, with the description thereon; and that subsequently he had no reason to suspect the genuineness of the description. As a matter of fact, however, the

Magnesia Company of Berlin did not manufacture the Star Company's mantles; and it would seem that the defendant must have got from them the clay collars, had them marked (either in the making or subsequently) with prosecutors' mark, and afterwards attached mantles to them. It was not insignificant that there were found in his possession quantities of both marked and unmarked articles when the police made their search. The statute made it an offence for any person to sell, or have in his possession for selling, any goods to which a false trade description was applied. Here goods were sold to which a false trade description was applied; and unless defendant proved that he had taken all reasonable precautions against committing an offence, and had no reason to suspect the genuineness of the trade description, and had given all the information in his power, or that otherwise he had acted innocently, he would be deemed guilty of an offence against the Act. The expression "trade description" meant any indication, direct or indirect, as to any goods being the subject of any existing patent, privilege, or copyright, and the use of any figure, word, or mark according to the custom of the trade commonly taken to be an indication of the copyright, privilege, or patent. A "false trade description" was such a trade description false in a material respect. The provisions of the Act applied to goods bearing figures, words, or marks, or any combination thereof, whether including a trade mark or not, reasonably calculated to lead persons to believe that the goods were the manufacture or the merchandise of some person other than the person whose manufacture or merchandise they really were. Under these provisions, therefore, it was submitted that there had been sold in this case, in response to a request for Star mantles, the two-clip mantles with prosecutors' marks—actually the number under which they held their privileges under the statute of 1883—which were not their manufacture, but imitations for the purpose of taking an unfair advantage of the privileges which his clients possessed.

Mr. *Harry Maisner*, called and examined by Mr. BODKIN, said he was Manager of the Star Company. He bore out Counsel's statement as to the purchase of Mr. Ahrendt's patent and the registered mantle design, the visit of Mr. Ball to defendant's, and the subsequent search of the premises.

Mr. AVORY said it must not be taken as agreed that the mantle was registered; the design was the rim, not the mantle. They were two distinct things.

Mr. BODKIN: Whatever the design includes has been transferred to the Company. The combined article I call a mantle. Separately they are not much use.

Mr. AVORY: I only want it to be understood at this stage that the mantle itself, as distinguished from the collar or rim, is not the subject of any design or any patent.

In further examination, witness said the mantles were only sold for use with the Company's burner. This burner was the only one adapted for two-clip collars. They used to get the mantles and collars from the Wholesale Fittings Company—that was, Mr. Altmann—but for some months past they had had them made in London. The former were marked "Made in Germany," with the number; the latter had on them only the number. The mantles bought from defendant were not sold to him by the Company, though they closely resembled them.

At the conclusion of witness's examination-in-chief, the further hearing of the case was adjourned for a month.

CLAIM AGAINST THE HUDDERSFIELD CORPORATION.

At the West Riding Assizes, recently held at Leeds, Mr. Justice Ridley and a Special Jury were engaged for several days upon a case in which Messrs. Middlemost Bros. and Co., Limited, woollen manufacturers, of Clough House Mills, Birkby, Huddersfield, sought to recover damages from the Corporation for negligence, caused by the obstruction of plaintiffs' water rights belonging to their mills, and for alleged nuisance and negligence. They also asked for an injunction to restrain defendants from continuing the obstruction. They further stated that certain water rights were given to them by their predecessor in title, Mr. John Scholes, and that the Corporation had notice thereof. They also alleged that when the Corporation constructed Norman Park they obstructed the flow of the stream from the Clough House Mills; that notice was given to them of the probable damage from such obstruction; and that on the 24th of July, 1904, a serious flood occurred, and by reason of the obstruction complained of, the water was forced back on to the plaintiffs' premises and overflowed, and plaintiffs sustained damage to the extent of £5000.

In their statement of defence, the Corporation did not admit the plaintiffs' water rights or that notice thereof had been given. They denied that they obstructed the stream, or that they had any notice of probable damage; also that the damage was occasioned by the obstruction or by their acts. They alleged that the damage was occasioned by the incapacity of the plaintiffs' own culvert to deal with the water, and that the alterations in Norman Park were made with plaintiffs' knowledge. They denied any negligence, and further stated that they acted in pursuance of their powers under the Huddersfield Improvement Act, and that any damage done was caused by the act of God, and not by negligence or omission on their part.

Mr. Scott Fox, K.C., Mr. W. J. Waugh, K.C., Mr. C. F. Lowenthal, and Mr. T. Ramsden appeared for the plaintiffs; the defendants were represented by Mr. E. Tindal Atkinson, K.C., Mr. H. F. Manisty, K.C., and Mr. A. P. Longstaffe.

In the result, his Lordship submitted the following questions to the Jury: (1) Did the defendants' obstructions, or either of them, interfere with the free flow of the water in the beck away from the plaintiffs' property? (2) Was the damage to the plaintiffs occasioned by that interference or obstruction? (3) Ought the defendants to have anticipated that the culverts and grating, as constructed by them, might in time of flood cause obstruction to the free flow of the water down the plaintiffs' culvert, and away from the plaintiffs' property? (4) Was there want of care or negligence on the part of the defendants in constructing or maintaining the culverts in the manner in which they were constructed, or in placing or maintaining the gratings at the entrance to the culvert? (5) Was the rainfall so excessive that it could not have been reasonably anticipated as possible by the defendants? Was it an act of God? (6) Was the damage occasioned by the defendants' obstructions checking back the unaccustomed flow of the water, or was it occasioned by the unaccustomed flow of the water independently of these obstructions? (7) Was the defendants' culvert, as constructed and maintained by them, including the obstruction caused by the grid, capable of taking all water that might in time of flood be reasonably expected to come down Grimscar Beck and down plaintiffs' culvert without danger of obstructing the water that would pass down their culvert and causing a head of water to rise against their premises?

The Jury retired, on the afternoon of the fifth day, and, after some deliberation, returned into Court with answers in the affirmative to the first and third questions, and in the negative to the seventh. The others were left unanswered. His Lordship said it was most desirable that the Jury should answer the other questions, one way or the other. He therefore asked them if there was any possibility of their coming to a decision. The Foreman inquired of his Lordship whether he could reduce the number of the questions. His Lordship said there were two which the Jury must answer in order to settle the case. They must say whether the flood was the act of God, and whether the damage was caused by the defendants' obstruction. He could not reduce these two questions. The Jury then retired again. On their return, the Foreman announced that in the fifth question they had struck out the words "Was it an act of God?" and that the result of their deliberations was an answer in the affirmative to Nos. 1, 3, and 5; to Nos. 2 and 6, "It was contributory;" to No. 4, "Yes, as to the gratings;" and to No. 7, "No."

The next morning, Mr. Scott Fox applied for judgment on behalf of the plaintiffs, and submitted that he was entitled to it. He claimed damages, an injunction, and a declaration. Mr. Tindal Atkinson contended that there was absolutely no evidence to show that the Corporation's grid, in cases of an ordinary flow of water or ordinary flood, had had the least injurious effect in checking the water, or caused the plaintiffs the slightest injury. The only evidence was that on one or two occasions, possibly as a result of the grid, obstruction had occurred, and the water was turned into the park. This, however, was upon the defendants' own property. He submitted that his Lordship was entitled to disregard the findings of the Jury. Justice Ridley acknowledged that they were a little difficult to deal with. They did not decisively and definitely come to the question that had been raised between the parties, and the reason was that some of the answers were the result of a compromise. He could only wish there had been that unanimity on the part of the Jury which would have enabled him to enter judgment on one side or the other. He thought, however, it must be entered for the plaintiffs. Mr. Tindal Atkinson asked for a stay of execution, pending an appeal; and his Lordship granted it and the injunction and declaration, with costs against the Corporation.

Dangerous Gas-Taps.—A few days ago the police found an old woman named Bodger lying unconscious in her house at Wavertree. Gas was escaping from one of the burners; and it was presumed that, in extinguishing the light, the deceased (who died without regaining consciousness) accidentally turned the tap right round. At the inquest, the Coroner remarked that the occurrence ought to be a lesson to everybody to see that their gas-fittings were perfect. Personally he regretted that the authorities had not the power to make periodical inspections.

Public Lighting of Paddington.—At the meeting of the Paddington Borough Council last Tuesday, the Works Committee reported, in connection with the scheme now being carried out for the improved public lighting by gas of the borough, that it was necessary to provide and fix between 30 and 40 new bracket lamps, and to alter the position of about 50 others. The Gaslight and Coke Company had offered to do this for £1 17s. 6d. per new bracket lamp and 8s. 6d. for each removal; and they suggested that the prices named should form an appendix to their existing contract. The Committee recommended that these terms be accepted; and this was agreed to.

Bombay Gas Company, Limited.—The report of the Directors of this Company for the year 1904 states that during this period there was an improvement in the sale of gas of 2 per cent., and that residuals sold better. There was a reduction in carbonization expenses. The balance of the profit and loss account is £21,715, making, with the amount brought forward, a total of £21,758. After allowing for the interim dividend paid in December, and placing £2000 to the reserve fund, there remains £12,558, out of which the Directors recommend a dividend of 3½ per cent., free of income-tax, making 6½ per cent. for the year, and carrying forward £4158. Mr. R. Davidson, one of the Directors, has retired through ill-health, and the Directors have appointed Field-Marshal Sir Evelyn Wood, V.C., G.C.B., to fill the vacancy on the Board.

Ilfracombe District Water Supply.—At their meeting last week, the Ilfracombe District Council decided to proceed at once with the work of laying water-mains to the villages of Morthoe and Woolacombe, which the Council have power under their Act to supply. The Chairman (Mr. J. C. Clarke) explained that they had made it a condition of the supply that Woolacombe should pay a guarantee of £900 and enter into a legal agreement as to the rentals. The sanction of the Local Government Board was required to the loan for the work; but it was understood, as the result of an interview at Whitehall, that though the Board would not give definite sanction for the work until they had the plans before them, no difficulty would arise if the works were begun. If the pipes were ordered at once it would be a month before they could be supplied; and if the work was to be completed before the summer, it was necessary to proceed with it. Some of the members were opposed to doing anything without the consent of the Local Government Board; but on a division, it was decided that a tender for the pipes should be accepted and the work proceeded with.

MISCELLANEOUS NEWS.

DEVONPORT GAS CONTROVERSY.

Issue of Writs for Slander.

Writs were issued last week at the instance of Mr. Sidney E. Stevenson, the Engineer of the Devonport Gas-Works, against Alderman W. Hornbrook, the Chairman of the Gas Committee, and Mr. H. Banbury, a member of the Committee, in respect of the statements made by those gentlemen at the meetings of the Town Council on the 13th and 14th inst. It transpires that the letters received at the meeting on the latter day by Messrs. Hornbrook and Banbury from Mr. Stevenson's Solicitors contained a demand for the withdrawal of the allegations against Mr. Stevenson, and an apology. As there was no withdrawal of the statements, writs were issued for slander; and it is expected that the cases will be tried at the Devon Assizes at Exeter in June next.

The Gas Committee, at a meeting last Tuesday, decided to pay Mr. Stevenson three months' salary, and dispense with his services. A meeting of the Town Council will be held this week to consider the question of appointing a new Manager.

Though any reference to the assertion that £5 notes had been handed about was omitted from our necessarily abbreviated reports of the Town Council proceedings in connection with the Devonport trouble, the allegation has been so widely circulated that it seems to us only fair to call attention here to a letter which appears in the "Correspondence" column to-day. This letter is from Messrs. Blyth, Dutton, Hartley, and Blyth, who, acting for Messrs. S. Cutler and Sons, have, it will be seen, ascertained from the member who made the statement alluded to that he had no thought of connecting their clients with the matter. In submitting their tender for the carburetted water-gas plant in a perfectly legitimate manner, Messrs. Cutler certainly did not anticipate that they would be placed in the unpleasant position of rendering themselves liable to such misconstruction because they happened to be the firm, in this instance, whose proposals were recommended for acceptance.

GAS PROFITS AT MANCHESTER.

Current Year's Estimates.

The Manchester Gas Committee, who have been considering their estimates for the current year, hope to be able to contribute £50,000 to the relief of the rates, notwithstanding the proposed reduction of 1d. per 1000 cubic feet to ordinary consumers which is now before the Council. This amount compares with £60,000 last year; but, on the other hand, the Committee will ask for only £62,233, to cover the cost of street lighting; whereas last year the estimate for this work was £71,226. This means a reduction on that account of £8993, and brings up the Committee's contribution in relief of the rates to practically £59,000. The estimated income on revenue account is £662,500, of which £546,000 will be from the sales of gas; the remainder coming chiefly from the sales of coke(£61,000), tar (£21,000), and sulphate of ammonia (£33,500). The estimated income a year ago was £697,000, and the actual receipts were £686,148. Cannel coal and oil are expected to cost £242,000 in the current year; and among some other of the larger figures of expected outlay are: Carbonization (retort-men's wages, &c.), £51,000; repairs and maintenance of works and mains, &c., £77,000; salaries and wages, £46,000; rates, £45,000; interest on loans, £44,500; and sinking fund, £49,543. On capital account an expenditure of £79,920 is anticipated. The estimated profit for the year ending March 31 last was £46,639, and the actual profit, after making full provision for renewals, sinking fund, and all revenue charges, was £62,123.

THE PUBLIC LIGHTING QUESTION IN NEW YORK.

The Legislative Investigation.

In the "JOURNAL" for the 4th inst., it was mentioned that the investigation which had been authorized by the United States Senate into the circumstances connected with the negotiation and execution of the lighting contracts for the City of New York last year, to which reference had been previously made, was opened on the preceding Thursday. The Committee consists of three members of the Senate—Messrs. Stevens (Utica) and Page and Grady (New York)—and four of the Legislative Assembly; these being Messrs. Apgar (Westchester), Agnew (New York), Merritt (St. Lawrence), and Palms (Schoharie). Of these, Messrs. Stevens, Page, Apgar, Agnew, and Merritt are Republicans, and Messrs. Grady and Palmer are Democrats. The sittings of the Committee were held in the Aldermanic Chamber of the City Hall; and from reports of the proceedings which have been forwarded to us, an indication of their nature may be given.

The first evidence adduced was directed to showing that all the Lighting Companies of New York, both gas and electric, are under the sole control of the Consolidated Gas Company; and, further, that the stock of the Company has been "watered" to the extent of $9,000,000. Matters pertaining to the organization, capitalization, and the relations among themselves of the various Companies, were the only question taken up on the first day; and it was a surprise to some to find that the representatives of these bodies not only placed no obstacles in the way of the Committee, but volunteered much of the information that was obtained. Mr. James A. Bennett, the Treasurer of the Consolidated Gas Company, was called, and was asked how many shares of the New Amsterdam Gas Company were held by the Consolidated. To this question the Company's Counsel (Mr. C. E. Mathewson) objected; but subsequently witness read from the stock book of the Company, when it came out that of $9,000,000 of preferred stock issued by the New Amsterdam Company, the Consolidated Company own $8,977,500, and of $12,165,000 of common stock they own $12,109,500.

Another fact brought out was that the Consolidated Company had for the last six months been paying dividends at the rate of 10 per cent., and for several years had paid 8 per cent., notwithstanding the statement of the Treasurer that the Company had received no dividends from their stock in the New Amsterdam Company or the New York Edison Company—two of the chief constituent Companies. It was also shown that, though the New York Mutual Gaslight Company and the Standard Gaslight Company are not allowed, by their Charters, to consolidate with any other lighting company, the Consolidated own $4,630,900 of the common stock of the Standard out of $4,985,700 issued, and $3,934,400 of the preferred stock out of $4,295,700 issued; and of the $3,436,600 of stock issued by the Mutual the Consolidated Company own $1,763,200, or more than a controlling interest. Mr. Bennett admitted that the Company control the Mutual, the Standard, the New Amsterdam (who, in their turn, control the Northern Union, the Central Union, and the East River Gas Companies), and the Westchester Lighting Company—all the Companies operating in Manhattan and the Bronx.

With regard to the Electric Light Companies, practically complete ownership of the New York Edison Company—the principal one—by the Consolidated Gas Company was admitted by Mr. Bennett. Of $45,200,000 stock issued by the Edison Company, the Consolidated Company own all but $159,000 worth, at its par value of $100 per share. It came out in evidence that the Edison Company is the outcome of a consolidation of the New York Gas, Electric Light, Heat, and Power Company, known as the Power Company, and of the Edison Electric Illuminating Company, known as the Edison Company. The capital stock of the Power Company was $36,000,000, and of the Edison Company $9,200,000, making together the $45,200,000 of capital stock of the Edison Company in which they were merged.

By a series of questions put to Mr. Benjamin Whitely, the Assistant-Treasurer of the Consolidated Company, the Committee's Chief Counsel (Mr. C. E. Hughes) elicited statements to the effect that the stock of the original Edison Company, amounting to $9,200,000, was already owned by the Power Company, and was included in the $36,000,000 of capital. His purpose was to show that the $9,200,000 was improperly added to the New York Edison Company's stock when merging was effected. "Did the Consolidated Company acquire the capital stock of the Edison Electric Illuminating Company, which was merged in the New York Gas, Electric Light, Heat, and Power Company, to form the present Edison Company, or was that stock held by the New York Gas and Electric Light, Heat, and Power Company, of which the Consolidated Gas Company hold the stock?" asked Mr. Hughes. The witness answered: "The New York Gas, Electric Light, Heat, and Power Company owned very nearly all the stock of the Edison Electric Illuminating Company at the time of the amalgamation by which the present Edison Company was formed." "To put it popularly," said Mr. Hughes, "the Consolidated Company owned all the stock of the Power Company, and that Company owned substantially all of the stock of the Edison Illuminating Company; and then the New York Gas and Electric Light, Heat, and Power Company and the Edison Electric Illuminating Company of New York, consolidated with the Edison Illuminating Company, and the New York Edison Company was formed. Is that all?" Witness acquiesced, and said the Company was capitalized at the amount of the total capital of the Power Company, which was $36,000,000, and of the Edison Company, which was $9,200,000; thus making the capital stock of the New York Edison Company $45,200,000.

Further evidence disclosed the following particulars: Starting with this capitalization of $45,200,000, the Edison Company, by consolidations and amalgamations, acquired all the properties of the original Edison Company and also the properties of other Companies which had been merged into the Power Company, subject to a $21,000,000 mortgage issued for the acquisition of stock, and subject to $11,500,000 in bonds which had been issued by the Power Company. There was thus $32,500,000 in bonded indebtedness; and at back of this $45,200,000 in stock of the Edison Company. To obtain this the Consolidated Company increased their capital stock from $54,595,200 to $80,000,000, all of which has been issued. The value assigned to all the securities of other Companies now on the books was stated to be $56,236,148. A further issue of stock has been arranged by the Consolidated Company, which will bring the capital up to $100,000,000; the additional $20,000,000 being required to take up debenture bonds which have already been issued, presumably to provide for the large expenditures in connection with the new gas plant at Astoria. It was to facilitate the working of this Company—the Astoria Gaslight Company, owned by the Consolidated Company through their control of a subsidiary corporation—that the Remsen Bill was passed by the Legislature, approved last year by Mayor M'Clellan, and then vetoed by Mr. Odell while he was Governor.

At the close of this evidence, Mr. Hughes announced that he must be informed as to the exact assets of the various Companies. It was inferred from this that it might be the intention of the Committee to attempt to lay down the actual value of the Corporations, for the purpose of arriving at what would be a fair return on the money invested, rather than on the amount of stock issued. He declined to comment on the result of the day's work further than to express his satisfaction with what had been accomplished. He alluded to the manner in which the complete control of the lighting situation by the Consolidated Company had been disclosed, and referred to the capitalization of the New York Edison Company, when $9,000,000 appeared to have been included which was comprised in the securities of a concern already owned by that Company. He said the facts must speak for themselves, and others than himself must draw any inferences they pleased from the testimony given.

At this point we will leave the inquiry for the present, but must not conclude without referring to a statement published in the

English papers on Monday last week, to the effect that Mr. Thomas Lawson has purchased a franchise for the sale of illuminating gas in New York City, and intends to begin a war against the Gas Trust, which, it is reported, is controlled by the leaders of Tammany Hall. Rumour says that Mr. Lawson means to sell gas at 75c. per 1000 cubic feet, which is about 25c. under the price charged by the Trust. He states that he is prepared to risk his entire fortune in fighting the Trust, and he believes the people of New York will support him.

LINCOLN CORPORATION WATER SUPPLY.

Mr. Percy Griffith on the Progress of the Boring.

In view of the late serious outbreak of typhoid fever at Lincoln, special interest attaches to the boring operations which are now going on at Boultham with the object of obtaining a supply of water from a source less liable to contamination than the present one. A report has recently been received from the Engineer-in-charge of this undertaking (Mr. Percy Griffith, M.Inst. C.E.); and we take from it a few particulars. It may be rememberd that the work was stopped in November, 1903, by the loss of the boring-tool. This has recently been recovered, and operations have been resumed. This being the case, Mr. Griffith thought that the Corporation would desire to consider the present situation, as well as the prospects of obtaining a supply of water from the boring when completed. As the tool was embedded at a depth of 860 feet, it was necessary to continue the shaft beyond the depth mentioned in the specifications (400 feet); and a shaft 9 feet in diameter has been carried down to a total depth of 862 feet from the surface. As this portion of the shaft would not involve the Corporation in any extra cost to that of the boring, apart from the question of delay, their interests have not been prejudiced by the accident; but, on the contrary, the work, when completed, will be of a more satisfactory character than was originally contemplated.

Mr. Griffith reports that, as regards the portion of the boring now to be proceeded with, a further advantage will be secured in the fact that the 30-inch diameter tubes removed from the upper portion of the boring will be refixed below the bottom of the shaft, and will thus secure a waterway far in excess of that originally intended without involving any extra cost to the Corporation. It is now proposed to complete the well at the depth of 890 feet by a concrete bottom made perfectly water-tight, and to carry the 30-inch tubes to a further depth of about 380 feet. This will enable the subsequent stages of the work to be proportionately increased in diameter, and thus render more secure the ultimate completion of the boring of the full size specified. The existence of a shaft 890 feet deep will also greatly facilitate the carrying out of the boring operations. Mr. Griffith points out that the depth of the lias beds and thickness of the rhœtic shales have proved somewhat greater than was expected. It does not, however, follow that the same result will be found in regard to the thickness of the marls. Should, however, these be of the thickness suggested in his report—viz., 810 feet—a depth of 618 feet from the bottom of the shaft will carry the boring into the sandstone; and within a depth of from 50 to 100 feet below this, definite evidence will be available as to the probable quantity and quality of the water to be obtained, as at this stage of the work it may be expected that the water from the sandstone will rise from the boring and well up to its normal rest level. As to when the boring will be completed, Mr. Griffith thinks a supply of water will be tapped before the end of the present year; and if the circumstances then are as serious as they are now, he has no doubt means could be devised for securing the Corporation the use of the supply pending the completion of the boring.

In referring to the Gainsborough bore, Mr. Griffiths says: "The Committee will be interested to know that a recent test of the yield has shown an increase, compared with the yield on starting the pumping machinery twelve months ago, of 17 per cent.; the figures being 30,000 gallons per hour in March, 1904, and 35,000 gallons per hour at the present time. This is no doubt due to the constant flow of water clearing and enlarging the fissures in the sandstone; and a similar result may be expected in connection with the Lincoln boring. The fact that the Gainsborough Council are in a position to supply the Lincoln Corporation with 100,000 gallons per day from their boring at the present time, will, no doubt, be appreciated by the Committee as of some significance in connection with their own boring."

SUNDERLAND AND SOUTH SHIELDS WATER BILL.

Proposed Withdrawal.

The shareholders of the Sunderland and South Shields Water Company have held a special meeting for the purpose of discussing the proposal made by the House of Commons Committee by whom the Company's Bill was recently considered (*see* "JOURNAL" for March 28, p. 858) that the water should be softened. The idea did not commend itself to the Directors, who therefore decided to call the proprietors together to ascertain their views on the matter.

Mr. R. H. Gayner, who presided over a large attendance, said the Board thought that this was a most critical and important question. The one great objection they had to such a suggestion as had been put forward by the Committee was that it would make undrinkable the water of which they were all so proud. In putting in the softening clause, the Committee were falling in line with the objection of the Corporation. The only reason for the meeting of the shareholders was to ask them whether or not the Directors should proceed with the Bill, which, they were told, would increase their expenditure on plant, &c., by from £150,000 to £200,000. For this they would get no compensation out of the private consumer, unless they proceeded to Parliament

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specially for the purpose; but they could put an extra charge of 2d. per 1000 gallons on the water supplied to manufacturers. At a recent meeting of the Company, he had said that their dividend was practically assured for some time to come; but in the face of what had since occurred, he wished to qualify this statement, as he could not now be responsible. Mr. T. W. Stuart, one of the Directors, who is a chemical expert, pointed out that Professor Percy Frankland had designated their water as one of the purest he had ever examined, and had expressed the opinion that it was not at all necessary to soften it. Continuing, Mr. Stuart remarked that if the softening process could be employed in one central station, possibly the cost might not exceed ½d. per 1000 gallons (the figure mentioned by the Commons Committee). The distribution of the Company's thirteen pumping-stations, however, at such great distances from each other, would necessitate the erection of a softening plant at each station, at an estimated cost of £150,000; while the cost of softening would, at ½d. per 1000 gallons, be £7500. He added that the Directors felt the only real advantage that would accrue to the consumers would be the softening of the water for washing—an advantage balanced by many disadvantages besides the cost.

After many speeches had been delivered calling for the abandonment of the Bill, the following resolution was carried—"That this meeting of shareholders, having received a full and detailed explanation of the proceedings before the House of Commons, recommends the Directors to consider the advisability of withdrawing the Bill."

Incandescent Gas Lighting at Tiverton.—From statements which have appeared in the local Press, it is apparent that Mr. Clark Jeffery, who was appointed to take charge of the gas-works some nine months ago, has effected some great improvements in the public lighting, by means of the replacing by incandescent burners of the old-fashioned ones hitherto in use. In addition to this, it is satisfactory to learn that, under Mr. Jeffery's administration, the works have been put into a thorough state of repair, and a laudable spirit of zeal and efficiency prevails among all employed there. The results of the year's working will, it is hoped, be satisfactory, despite the fact that the expenses have necessarily been abnormally high. The prospects for the year just begun are altogether favourable.

The Eastbourne Gas Company and the Corporation's Electric Lighting Order.—The Eastbourne Gas Company have threatened to oppose the application of the Corporation for a Provisional Order to supply energy to Willingdon, unless they amend the Eastbourne Order by inserting a retrospective clause into the Willingdon Order, compelling them at the end of the third year to reconsider, and, if necessary, revise, the price of energy, so that, so far as is reasonably practicable, no rate will be required for the purpose of defraying the future expenses of the undertaking. Though the matter is to be submitted to the arbitration of the Board of Trade, the Company reserve to themselves the option of carrying their opposition to the House of Lords. The Corporation are willing to insert the clause, *minus* the retrospective power, into the Willingdon Order.

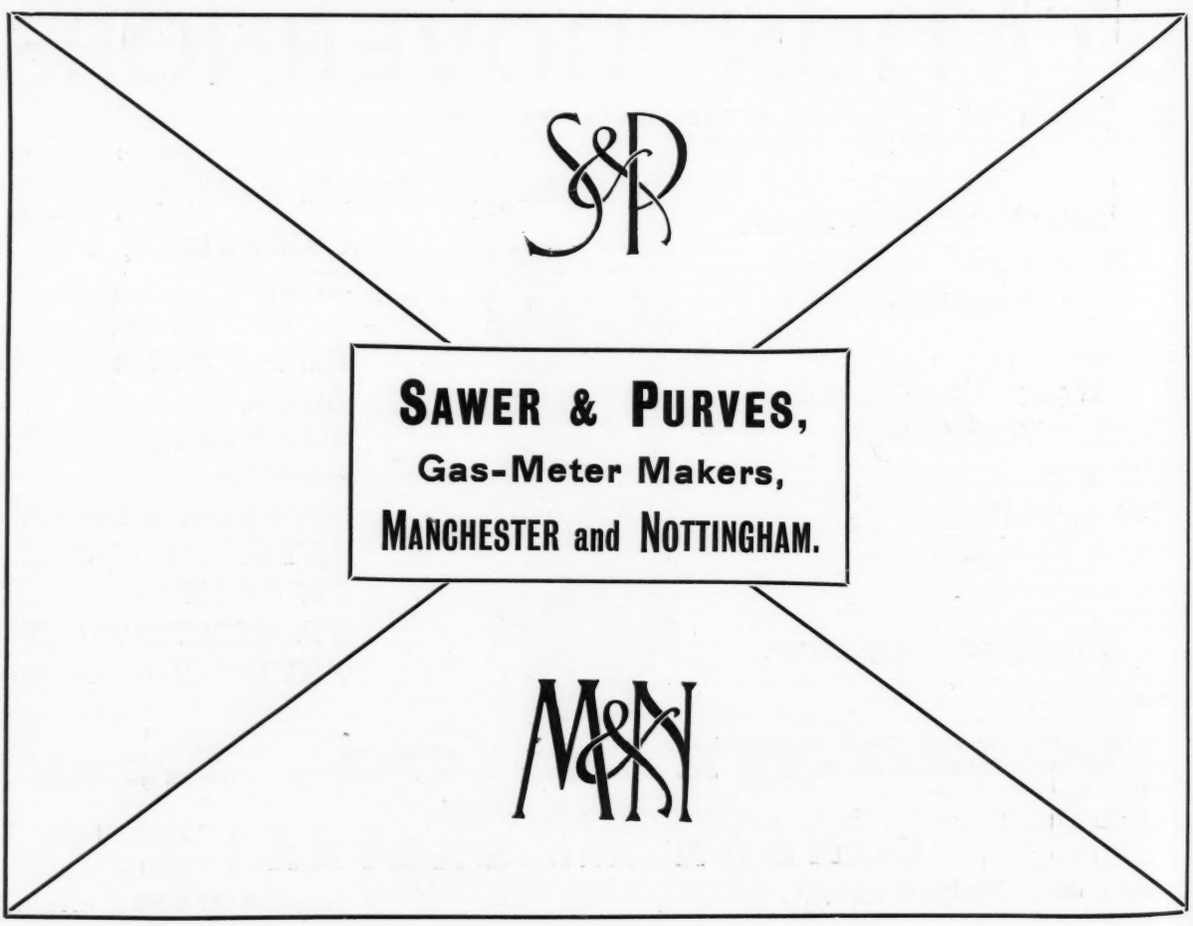
NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The "Glasgow Herald" of yesterday states that a special full meeting of the Town Council of Falkirk was held on Thursday night, and that at it it was reported that at a recent meeting of the Gas Committee a recommendation was adopted to the effect that Mr. H. Russell, the Convener of the Gas Committee, be asked to resign the convenership. The recommendation, it was stated, arose out of a statement made by Mr. Russell at the monthly meeting of the Council, and not subsequently substantiated by him, in which he asserted that he had in his possession an offer from a firm who had tendered to the Council to supply plant for £626, to supply the same class of plant for £430. It was stated that at the Committee meeting Mr. Russell was asked to table what document he had concerning this matter, but that this was defeated in Committee. It was also reported that, at a later meeting of the Committee, a letter was submitted from the firm, asking the Committee to state unreservedly that there was no reflection upon them. The minute of the Gas Committee stated that Mr. Russell could not substantiate the charges he had made in public, and the Committee accordingly recommended that he be asked to resign his convenership. At the meeting of the Town Council on Thursday night, Mr. Russell moved approval of this minute, and said he was ready not only to resign his convenership but also his membership of the Town Council, because he and the Gas Manager could not agree. An amendment was moved to the effect that the recommendation of the Committee be deleted from the minutes; but, on being put to the meeting, the motion was carried by seven votes to four. There is trouble of another sort at Falkirk. A special meeting of the Town Council was recently held, at which, it is stated, Provost Christie explained that he had called it to consider the serious question of an alleged theft of about forty tons of coal at the gas-works. The Council ordered a thorough investigation into the affair to be made.

The combination of circumstances which led to the overwhelming volume of business last week relating to the gas supply of Edinburgh and Leith has broken up, and this week only an insignificant trickle comes my way. Two letters have appeared in newspapers, each containing suggestions of such undoubted originality that it is a pity they were published anonymously. One of the writers spent a public holiday in a walk to the gas-works, "to see what he could discover." He did discover something. He was, he said, "surprised to see the vast amount of coal stored at the works. There thousands of tons of coal are exposed to wind, rain, and sun, and must lose a great deal of their gas-producing quality; and what that loss is, in the summer season, must be very great indeed. . . . If no gas was produced at the Granton Gas-Works at all, the gas given off from that huge mass of coal is sufficient to cause the nuisance complained of. A humid atmosphere, with a gentle breeze from the west, must raise the temperature of the coal, when the gas given off leaves the coal in a very poor state



for the production of good gas." This writer, No. 1, beginning as a sentimental seeker after facts, very soon develops into the warrior with the mailed fist. There is a popular notion among herbalists that wherever a poisonous plant is found, there is always one growing near the properties of which will neutralize the evil effects of the other. The other writer supplies the antidote by putting the question why these stacks of coal at Granton are not whitewashed, as coal stacks elsewhere are. His theory is that if the coal were whitewashed, rain would wash lime into the crevices of the coal, sealing them up, and thereby preventing the escape of the gas. Then the atmosphere would be pure. These are wonderfully simple suggestions, but also wonderfully amateurish, and not calculated to do much in the way of arriving at a settlement of a question which could not be more vexing if it were more real.

On the consideration of the Gas Committee's minutes at the Greenock Corporation on Tuesday, Treasurer Brown strongly objected to any more money being spent on the retort-house at Inchgreen. He said that about three or four years ago he characterized the gas-works at Inchgreen as being rotten from top to bottom. Some took exception to this remark; but since then they had spent about £25,000 on the retort-house, and now it was proposed to incur an outlay of £39,000 on extending the works generally. The expenditure would mean an outlay of about £50,000 in a few years. The minutes of the Gas Committee were eventually agreed to.

The Peebles Town Council had before them last week the question of the opening of their new gas-works. The total cost, it was stated, would be about £21,000; and authority was given for the borrowing of further money. Mr. Bell, the Manager, in reply to a question, said he had begun to fire the new works that day, and he expected to be making gas in five or six weeks' time. A Committee was appointed to make arrangements for the opening ceremony.

At a meeting of the Forfar Town Council on Wednesday, Mr. MacDougall, the Convener of the Gas Committee, stated that the Committee recommended the purchase of 3500 tons of coal at the price of 16s. per ton, which was 6d. per ton less than that paid during the current year.

Dispute over a Gas-Works Boundary Wall.—Controversy has again arisen respecting the boundary wall of the Okehampton Gas-Works. Some months ago, the local Charity Trustees laid claim to certain land adjoining the gas-works, and built a wall which the Town Council had pulled down. The question is now revived in consequence of the presentation of the bill for these abortive proceedings. The Charity Trustees are doubtful of their legal powers to pay the account, and at a recent meeting decided to invite the Town Council and the Gas Committee to submit the dispute to arbitration. The Gas Committee, however, say that the matter does not concern them; and yesterday week the Town Council, being evenly divided on the subject, resolved to do nothing in the matter. In the meantime, the wall requires rebuilding; and the cost of this has to be met by someone.

CURRENT SALES OF GAS PRODUCTS.

Week ending April 22.

The position is substantially unchanged. Holidays interfered with much business being done. Sulphate is a shade firmer for prompt. £12 15s. has been done on Beckton terms.

Sulphate of Ammonia. LIVERPOOL, *April* 20.

The demand has been well sustained; but it has been mainly for immediate and near delivery—buyers having, on the declining market in March, been induced to postpone their further purchasing longer than has been altogether prudent in many cases. Prices for April have therefore been maintained; the closing quotations being £12 11s. 3d. per ton f.o.b. Hull, £12 13s. 9d. per ton f.o.b. Liverpool, and £12 15s. per ton f.o.b. Leith. For May delivery, buyers are seeking to establish a lower level of prices; but current production is being removed by April demand, and in the meantime makers are in no hurry to anticipate a decline in May which may not be justified. In the forward position, prices are for the most part nominal; the views of sellers and buyers being too divergent to admit of much actual business.

Nitrate of Soda.

This article continues in good demand; and the local market is firm at 11s. 1½d. to 11s. 4½d. per cwt., according to quality.

Tar Products. LONDON, *April* 20.

Markets have been quiet during the past week, doubtless owing to the approach of the holidays. There has really not been any business doing in benzol; and consumers do not seem to take any interest in the article just at the moment. Values, however, remain unchanged. There are sellers of 90 per cent. at 8¾d. f.o.b. London; but at this price consumers decline to purchase. In 50-90 per cent., there is really no inquiry. In toluol, there is nothing offering at present for early delivery, so that it is almost impossible to fix the actual value; while for forward delivery makers ask 8½d. The demand for solvent still continues good for the special qualities; but as regards the ordinary, there is practically nothing doing. There is no business of importance to report in anthracene. One or two small parcels have lately been offering for early delivery; but consumers will only entertain business at prices which makers do not at present seem inclined to accept. There is still a fair business doing in crude carbolic acid; but consumers will not pay more than 1s. 9d. for April-June, while for the last six months of the year they speak of even lower prices. Manufacturers are not, however, at all willing to reduce their quotations; and as there does not seem much offering just at present, in all

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	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily.
BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	TONBRIDGE	300,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.)	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

AND IN ADDITION, 7,500,000 CUBIC FEET DAILY; also Coal-Gas Plants at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

probability prices will be well maintained. A little business has been done in crystals during the past week in 39-40 per cent. and also 34-35 per cent. Prices are fairly well maintained; and there does not seem any likelihood of a decrease in value just at present. Creosote continues very quiet. Business has again been done in the Yorkshire district at 1¼d. for April-June delivery; while in Manchester lower than this has been accepted. So far as London is concerned, there is very little business to report. Consumers here only offer very low prices for early delivery; while the largest producers maintain their quotations, evidently believing that the demand for export will a little later on absorb the bulk of the London make. Pitch is still very quiet for both prompt and forward delivery; and it is reported that offers have been made to consumers on the Continent for delivery all over next year at prices rather lower than those at present quoted for early delivery. So far as Belgium is concerned, there is very little demand indeed. Consumers appear to be well supplied for prompt; and as regards forward, they speak of lower prices than those at present ruling. In London, the largest producers are still firm in their ideas at 33s.; but consumers are not at all prepared to pay this price, as dealers will certainly accept considerably under same. In the Manchester and Liverpool district, there is a considerable quantity offering, especially for delivery over the next month or two.

The average values during the week were: Tar, 17s. 6d. to 21s. 6d; Pitch, London, 31s. 6d.; east coast, 30s.; west coast, 28s. to 28s. 6d. Benzol, 90 per cent., 8⅛d. to 8⅜d.; 50-90 per cent., 7¼d. to 7½d. Toluol, 8d. Crude naphtha, 3d.; solvent naphtha, 8d. to 8⅛d.; heavy naphtha, 10d. to 10⅛d. Creosote, London, 1⅛d. to 1⅛d.; North, 1¼d. Heavy oils, 2d. to 2¼d. Carbolic acid, 60 per cent., 1s. 9d. to 1s. 9¼d. Refined naphthalene, £4 to £8; salts, 13s. 6d. to 16s. Anthracene, "A" quality, 1½d. to 1⅝d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The demand for prompt still continues very good, and prices are well maintained; but as regards forward, there does not seem to be anything doing. Beckton quote £12 16s. 3d. for April shipment, but would accept £12 12s. 6d. for May-June. The South Metropolitan Company are still quoting £13; but no business is possible at this price. In Hull, business has been done at £12 10s. for prompt shipment, and there are still buyers at this figure; but for May-June, £12 8s. 9d. has been accepted. In Leith, it is very difficult to fix the actual value, but probably £12 15s. may be taken as a fair all round quotation.

Southport Gas Profits.—At the proceedings of the Gas Committee of the Southport Corporation last Tuesday, it was stated that the profits of the gas estate would this year be about £14,000, or nearly £2000 more than last year; and it is anticipated that of the total sum the bulk will remain free for distribution in aid of the rates. This will be the largest profit realized in the history of the undertaking, with the exception of 1898, when a sum £15,000 was earned.

COAL TRADE REPORTS.

Lancashire Coal Trade.

There is little change to report in the condition of the Lancashire coal trade. House coal still remains quiet, though last week, owing to the Easter Holidays, there was a little pressure to cover the present week, but mainly for lower qualities. Prices have not varied sufficiently to alter standard quotations. Engine fuel, including slack, is the most interesting feature of the market. The recent strong demand is still maintained—in fact, there is a scarcity of all descriptions of slack, with strong probabilities of hardening of prices. Coal for shipping meets with a moderate demand. Cannel is being delivered under contract in fair quantities. New contracts are being entered into for this, and also for coal, at prices for the most part equal to those of last year; but there are contracts reported for cannel which have been concluded at about 1s. per ton below 1904 rates. The average quotations were as follows: House coal, best, 13s. to 14s. per ton at the pit, seconds 12s. to 13s., common 9s. to 10s., steam and forge 8s. to 9s., engine 7s. 6d. to 8s. 6d., slack 7s. to 7s. 6d., medium 6s. to 7s., common 5s. to 5s. 9d.

Northern Coal Trade.

There has been more activity in the coal trade in the last few days, as some kinds of fuel have been needed in stock; and with a fuller output at the collieries there has been a larger sale. In the steam coal trade, the exports have begun to Cronstadt, which is one of the great markets for that class of coal from the north-east. Best Northumbrian steams are from 9s. 3d. to 9s. 6d. per ton f.o.b.; second-class steams are about 8s. 6d. per ton, and steam smalls are firmer at from 4s. 9d. to 5s. 6d. The gas coal trade is steady; the decrease in the home deliveries being in some part counterbalanced by the larger shipments abroad. The price of gas coals varies from 7s. 10d. to 8s. 3d. per ton f.o.b., for good Durham kinds. The contracts have been renewed for the gas coals for South Shields—some 4000 tons monthly—and the renewal is at just about the same price as the contracts settled a year or so ago. One or two smaller contracts are also in the market. Coke is very firm; but gas coke does not seem to share the improvement, even though the production is decreasing. Still, some good gas coke is being exported; and the price is from 12s. to 13s. per ton f.o.b.

Scotch Coal Trade.

It is announced that orders have begun to come in more freely than for some time, and that there is a more hopeful view of trade, although prices have scarcely begun to move. The improvement is being felt first of all at the collieries, where the miners are getting better time. The prices quoted are: Main 7s. 3d. to 7s. 6d. per ton f.o.b. Glasgow, ell 7s. 9d. to 9s., and splint 8s. 3d. to 8s. 6d. The shipments for the week amounted to 224,533 tons—an increase of 10,272 tons upon the

No Drawing Stage required.

Hot Coke Fed to Producer.

WRITE FOR ESTIMATES.

PATENT "DWARF" INCLINED BENCH.

NEW CONVEYOR CO., LTD., SMETHWICK.

previous week, but a decrease of 7871 tons upon the corresponding week of last year. For the year to date, the total shipments have been 3,171,538 tons—an increase of 270,415 tons upon 1904.

Gas and Water Profits at Rochdale.—The profits of the Gas Committee of the Rochdale Corporation for the financial year just closed, which will be reported to the Council at their next meeting, amount to £19,598, against £14,825 last year—an increase of £4773. In the Water Department, the receipts from the old works total to £41,160, and from the new ones at Todmorden to £2355. These returns show an improvement on the right side. There will be a lower rate by £2754 than there was a year ago.

The Wentwood Water-Works of the Newport Corporation.—On Monday of last week, the Water Committee of the Newport (Mon.) Corporation visited the Wentwood Water-Works, to witness the unveiling by the Chairman (Alderman Goldsworthy) of a tablet commemorating the completion and opening of the undertaking. The tablet bears an inscription to the effect that the reservoir was commenced in August, 1894, and was opened in May, 1904, by the Mayor (Mr. W. Clifford Phillips). Alderman Goldsworthy shortly traced the history of the scheme, and remarked that it was satisfactory to note that the reservoir was perfectly water-tight.

Striking Testimony to the Efficiency of Incandescent Gas Lighting.—The hailing of a cyclist before the Heywood Bench a few days ago resulted in the payment of a neat compliment to the authorities on the way in which the town is lighted by means of Welsbach Kern burners and Welsbach mantles. Charged with riding without a light, the cyclist in question pleaded in excuse that the streets were so well lighted that he could not see his lamp had gone out. Luckier than most persons who find themselves in similar circumstances, this gentleman was let off on payment of the costs. Evidently the Magistrates (several of whom, it is stated, were members of the Town Council) must have thought there was something in the defence.

Danger of Over-Weighting Old-Fashioned Gas Chandeliers.—An inquest was held at Lambeth on Thursday week concerning the death of Charles Johnson, aged 62, a carpenter, lately residing at Wyvil Road, Wandsworth, who died from the effects of coal gas poisoning. On the previous Sunday morning, it was discovered that gas was escaping from an old-fashioned chandelier, which had slipped down, in deceased's bedroom; and he and his wife were found in bed unconscious. They were conveyed to the hospital; but the man died the same night. The doctor stated that had the deceased been in good health at the time of the accident, he would have recovered. It was pointed out that incandescent light fittings were affixed to the chandelier in question, which contained no water. The Jury returned a verdict of "Accidental death," and added a rider to the effect that gas companies should warn people of the danger of over-weighting old-fashioned chandeliers with incandescent fittings.

New Issue of Shares in the Pinner Gas Company.—Tenders were recently invited for 400 £5 "B" shares in the above-named Company, for which the standard rate of dividend is 7 per cent. per annum, subject to the sliding-scale. We learn that they were over-subscribed, and that no shares were allotted at less than £7 each.

The Cleveland Water Famine.—The industrial outlook for Cleveland has lately been gloomy in the extreme. It is hoped that the changeable weather now prevailing may substantially improve matters; but, in consequence of the notices issued by the Cleveland Water Company to curtail the supply of water for manufacturing and trade purposes at the end of the present month, unless rain fell in the interval, the workmen at the Brotton Mines on Saturday week received intimation that their services would not be required after the expiration of fourteen days. Should the Company's notice not be withdrawn, a number of other men will be thrown out of employment through stoppage of those mines which are dependent for their water supply upon the Company.

Accident at the Gosport Gas-Works.—During an examination of some extensive alterations which are being effected at the works of the Gosport Gas Company, a series of accidents befell Mr. W. R. Irons (a son of the Manager) and a couple of employees named Cox and Neat. Some archways had been partly removed in the retort-house; and while Mr. Irons was standing at the top of the brickwork, the centre arch collapsed. The *débris* nearly buried Neat and Cox; and when they were rescued it was found that the former had sustained a fractured leg, while Cox was very badly bruised and injured about the body. Neat was conveyed to the Royal Portsmouth and Gosport Hospital, where he remains under treatment. After some little time, Cox was enabled to proceed to his home; and Mr. Irons, whose ribs were badly bruised, was also removed to his house. The archways on either side of the one that collapsed had been partially taken down; but the centre one had not been interfered with at all, and great care had been exercised in the demolition.

Proposed Water Supply for Tisbury.—An application by the Tisbury Rural District Council for sanction to borrow about £5500 for purposes of water supply, has been the subject of a Local Government Board inquiry. The question of a water scheme for the parishes concerned—East Tisbury, West Tisbury, and Wardour—has been under consideration for about ten years; but only now has a proposal been formulated that has met with the unanimous approval of the three Parish Councils. This has been prepared by Mr. Cyrus Combes, and is a gravitation scheme; the water being drawn from springs giving a constant supply. The water from the springs will be intercepted underground; and it is estimated that the supply will be equal to 14 gallons a head per day. A considerable amount of opposition was evinced at the inquiry by farmers and others, who contended that while under present conditions they had plenty of water for their own purposes, they would be compelled to contribute to the cost of the scheme if it were carried out.

WALKER'S PATENT

SULPHATE OF AMMONIA PLANT

Recovers the WHOLE of the Ammonia.

SULPHUR RECOVERY PLANT

For Recovering the Sulphur from Waste Gases of Saturator.

FOR FULL PARTICULARS AND MODELS OF PLANT, WRITE

C. & W. WALKER, Ltd.,

Midland Iron Works: DONNINGTON, NEWPORT, SALOP.

London Office: 110, CANNON STREET, E.C.

Issue of Bournemouth Gas and Water Stock.—The tenders for the issue of 2000 £10 7 per cent. "B" shares in the Bournemouth Gas and Water Company (which were asked for recently in the advertisement pages of the "JOURNAL") were opened last week at the offices of the Company. They showed that the issue was applied for more than three times over. It was allotted at an average price of £16 per share—an excellent result.

A Large Reduction at Holywood.—The Holywood (Co. Down) Gas Company, Limited, intimate that from and after the 1st prox. the price of gas will be reduced from 4s. 2d. to 3s. 9d. per 1000 cubic feet. The future price, when compared with other country towns, will it is said be lower than that charged in any other town in Ireland having a population similar to Holywood. The Company are busily engaged pushing the letting and sale of gas stoves and other appliances among all classes of the consumers.

A Successful Exhibition of Gas Apparatus in South Devon.—The attendance at the first trade exhibition at Topsham (South Devon) on the 17th inst. was most satisfactory. The arrangements devolved chiefly upon the proprietor of the gas-works (Mr. J. G. S. Lee), who is to be congratulated on the result of his efforts. The exhibition is being held in St. Margaret's Hall, which is illuminated by various kinds of gas-burners of tasteful design. The lamps in use include a Lucas, of 250-candle power, which gives 1¾ hours' light for 1d., and the "Bijou" burner, of 20-candle power, giving 18½ hours' light for a like sum. There are inverted burners of choice design, a pneumatic distance lighter, discount gas-meters, and an assortment of gas-irons and fire-stoves. A speciality is Willey's "Standard" cooking-ranges, which are shown in a great number of sizes. One of these stoves is used by Mrs. E. R. Dean, who gives demonstrations in cookery at intervals.

Bideford and District Water Supply.—The question of water supply is engaging the serious attention of the authorities at Bideford and the neighbouring district of Instow. As was recently stated in the "JOURNAL," the Bideford Corporation decided to approach the Northam District Council with an offer of terms for a supply of water under agreement for a series of years. The recently completed waterworks of the Northam Council have given that body a supply sufficient, not only for their own needs, but for those of their neighbours. Bideford proposed an agreement for seven years, and payment of £100 per annum for an amount not exceeding 4 million gallons per annum; any quantity in excess of this to be paid for at the rate of 6d. per 1000 gallons. The Northam Council decided to ask £200 per annum, and to charge 6d. per 1000 gallons for any quantity in excess of 8 million gallons. With regard to the supply of Instow, this would involve the laying of a pipe across the river; but Mr. Baldwin Latham has informed the Northam Council that there would be no difficulty about this. It was decided by the Northam Council that the price to be charged to Instow should be 8d. per 1000 gallons, with a minimum of £25 per quarter.

The Borough Surveyor of Reading has been instructed to have the bandstand in the Forbury Gardens lighted by an installation of four Humphrey incandescent gas-lamps with four burners each.

In the "JOURNAL" a few weeks ago, reference was made to the excellent display of the Lichfield Gas Company at the Arts and Crafts Exhibition held in the city. We are pleased to find that the Committee of the exhibition at their final meeting passed a special vote of thanks to the Directors "for kindly coming forward and assisting them by supplying, free of expense, a high-pressure system of incandescent lighting throughout the hall. It was voted a great success of modern lighting, and was also considered a striking feature of the exhibition." The courtesy shown by the Company's Manager (Mr. F. Key) during the whole time of the exhibition was also placed on record.

We learn that the Directors of the Woodbridge Gas Company have shown a practical appreciation of the efforts of their Manager (Mr. M. Orme) in making the recent gas exhibition so successful, and for the excellent lecture given by him in connection therewith, which was illustrated by means of a full model working gas plant; the lecturer each evening placing coals in the retort, and burning the gas produced. He also explained the principles of combustion, illustrating his text by examples of the various burners in vogue. There was a large and appreciative audience each evening; and the Directors feel that the result will be a greater degree of confidence in the Company and the commodity they supply.

Water waste in Buffalo has been investigated recently with interesting results. In one section a flow of 40 cubic feet per minute in the supply main was registered at midnight. The buildings were inspected and notices served to repair 160 services, 255 closets, and 182 faucets. Three weeks later another midnight reading showed that the main was running only 10 cubic feet. In a second section of the city, a midnight reading showed 42·5 cubic feet running every minute. After an inspection of the houses in this district, notices were served to repair 125 services, 275 closets, and 204 faucets. A month later another midnight reading showed that only 7·5 cubic feet per minute was flowing in the main. These figures prove conclusively how valuable a fairly complete installation of meters would be in the city.

The Derwent Valley water scheme has necessitated some large contracts for water-pipes; and four have already been let. The first and second were entrusted to the Staveley Coal and Iron Company, Limited, the first being for about 9000 tons of pipes of 45, 27, and 24 inches in diameter, while the second was for 10,000 tons, chiefly 45 inches in diameter, and all 12 feet long. Contract No. 3, which was for about 12,500 tons of 45-inch pipes, was secured by the Stanton Iron Company; while No. 4, which has just been given out, has been divided between the Staveley Company and the Sheepbridge Coal and Iron Company. This contract is by far the largest, comprising no less than 31,000 tons of pipes of varying diameters. The Staveley Company have secured about 25,000 tons of the larger sizes, and the Sheepbridge Company some 6000 tons of the smaller sizes.

Gas Cookers 30 varieties.

CARRON

Carron Company.

Works: CARRON, Stirlingshire, N.B.

Incorporated by Royal Charter 1773.

Agencies in all large Towns.

A suction gas-producer plant has lately been installed at the West End Mills, Dewsbury, for use with a motor driving rag machine. The makers of the plant are the National Gas-Engine Company, Limited, who claim a saving of 75 per cent. in the cost of gas compared with ordinary coal gas at 2s. 6d. per 1000 cubic feet.

At the meeting of the Paddington Borough Council last Tuesday, the tenders of Messrs. Pontifex and Co. were accepted for the annual supplies of gas-lamp columns and lanterns and other fittings for public lamps, as well as for testing and repairing meters, meter-boxes, governors, and cocks, for three years.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

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All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

WANTED, FOR SALE, CONTRACT, &c. ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

CARBONIZING FOREMAN. Longton Gas Department. Applications by May 1.
CLERK OF WORKS. No. 4385.

Pupil Wanted. No. 4382.

Agent Wanted (Incandescent). No. 4386.

Agency Wanted (Castings, &c.). No. 4383.

Situations Wanted.

GAS FITTER, &c. Gibson, Wellingborough.
MANAGER OR MANAGER AND SECRETARY. No. 4384.
OUTDOOR SUPERINTENDENT. No. 4372.

Tank Waggons to Let.

CLAYTON ANILINE COMPANY.

Plant, &c., for Sale.

CONDENSER. Redditch Gas Company.

Stocks and Shares.

CHIGWELL, LOUGHTON, AND WOODFORD GAS COMPANY. May 16.
FELINSTOWE GAS COMPANY. May 16.
LOWESTOFT WATER AND GAS COMPANY. May 16.
SOUTHEND WATER COMPANY. May 16.
SOUTH-WEST SUBURBAN WATER COMPANY. May 16.
WANDSWORTH AND PUTNEY GAS COMPANY. May 16.
WOKINGHAM WATER COMPANY. May 16.

TENDERS FOR

Carbon.

CHERTSEY GAS COMPANY.

Coal and Cannel.

BIRKENHEAD GAS DEPARTMENT. Tenders by May 18
CAMBOURNE GAS COMPANY. Tenders by May 1.
LEIGH-ON-SEA GAS DEPARTMENT. Tenders by May 3.
LOUTH GASLIGHT COMPANY. Tenders by May 6.
WIDNES GAS DEPARTMENT. Tenders by May 2.
WOKINGHAM GAS DEPARTMENT. Tenders by May 2.

Exhausters and Engines.

BRIGHOUSE GAS DEPARTMENT. Tenders by May 8.
MANCHESTER GAS DEPARTMENT. Tenders by May 13.

Elevator and Conveyor.

BIRKENHEAD GAS DEPARTMENT. Tenders by May 4.

Gasholder and Tank.

COALVILLE GAS DEPARTMENT. Tenders by May 1.

Gasholder and Alterations.

NEWTON-IN-MAKERFIELD GAS DEPARTMENT. Tenders by May 6.

Pipes and Specials.

RADCLIFFE AND PILKINGTON GAS COMPANY. Tenders by May 2.

Purifiers, &c.

BIRKENHEAD GAS DEPARTMENT. Tenders by May 4.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 221.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
500,000	10	Apl. 13	10½	Alliance & Dublin 10 p.c.	21—22*	..	4 15 5
160,000	10	,,	7½	Do. 7 p.c.	14—15*	..	5 0 0
200,000	5	Nov. 11	6½	Bombay, Ltd.	6½—7½	..	4 9 8
140,000	5	,,	6½	Do. New, £4 paid	5—5½	..	4 14 6
50,000	10	Mch. 15	14	Bourne-mouth Gas and Water } 10 p.c. B 7 p.c. Pref. 6 p.c.	29½—30½	..	4 11 10
251,810	10	,,	7		16½—17½	..	4 0 0
53,200	10	,,	6		15½—16½	..	3 12 9
380,000	Stk.	Feb. 24	12	Brentford Consolidated	247—252	..	4 15 3
300,000	,,	,,	9	Do. New	18—190	..	4 14 9
50,000	,,	,,	5	Do. 5 p.c. Pref.	127—132	..	3 15 9
206,250	,,	Dec. 15	4	Do. 4 p.c. Deb.	105—108	..	3 14 1
220,000	Stk.	Mch. 15	11	Brighton & Hove Orig.	223—228	..	4 16 6
246,320	,,	,,	8	Do. A. Ord. Stk.	165—170	..	4 14 2
400,000	20	Mch. 30	10	British	401—41½	..	4 16 5
100,000	Stk.	Feb. 24	6	Bromley, Ord. 5 p.c.	118—123	..	4 17 7
165,700	,,	,,	4½	Do. do. 3½ p.c.	90—94	..	4 15 9
500,000	10	Oct. 13	7	Buenos Ayres (New) Ltd.	12½—13	..	5 7 8
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	96—98	..	4 1 8
150,000	20	Mch. 15	8½	Cagliari, Ltd.	25—27	..	6 2 3
100,000	10	Sept. 29	10	Cape Town & Dis., Ltd.	17½—18	..	5 11 1
100,000	10	Oct. 27	4½	Do. 4½ p c Pref.	9½—10½	..	4 7 10
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,400,000	Stk.	Feb. 24	5⅛	Commercial 4 p.c Stk.	115—118	..	4 8 1
560,000	,,	,,	5	Do. 3½ p.c. do.	111—114	..	4 7 9
450,000	,,	Dec. 15	3	Do. 3 p.c. Deb. Stk.	86—88	..	3 8 2
800,000	Stk.	,,	6½	Continental Union, Ltd.	110—113	..	5 15 1
200,000	,,	,,	7	Do. 7 p c Pref.	140—145	..	4 16 7
424,070	Stk.	Feb. 18	5½	Derby Con. Stk.	123—125	..	—
55,000	,,	Jan. 3	4	Do. Deb. Stk.	108—110	..	3 12 9
486,090	10	Jan. 27	11	European, Ltd.	22—23	..	4 15 8
354,060	10	,,	11	Do. £7 10s. paid	15—16	..	5 3 2
15,243,200	Stk.	Feb. 10	4⅛	Gas-light and Coke } 4 p.c. Ord. 3½ p.c. max. 4 p.c. Con. Pref. 3 p.c. Con. Deb.	97—98	−½	4 9 9
2,600,000	,,	,,	3½		92—94	..	3 14 6
3,799,735	,,	,,	4		110—112	..	3 11 5
4,193 975	,,	Dec. 15	3		92—92	..	3 5 3
258,740	Stk.	Mch. 15	5	Hastings & St. L. 3½ p.c.	100—103	..	4 17 1
70,000	10	Sept. 29	11	Hongkong & China, Ltd.	16½—17½	..	6 5 9
3,800,000	Stk.	Nov. 11	10	Imperial Continental	218—221	..	4 10 6
473,600	Stk.	Feb. 10	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Mch. 15	6	Lea Bridge Ord. 5 p.c.	120—125	..	4 16 0
561,000	Stk.	Feb. 24	10	Liverpool United A	221—223	..	4 9 8
718,100	,,	,,	7	Do. do. B	162½—164½	..	4 5 1

Issue.	Share.	When Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
306,083	Stk.	Dec. 30	4	L'rpool Unit'd Deb. Stk.	111—113	..	3 10 10
75,000	5	Dec. 15	5	Malta & Medn., Ltd.	4—4½	..	5 11 1
560,000	100	Apl. 1	5	Met. of } 5 p.c. Deb.	101—103	..	4 17 1
250,000	100	,,	4½	Melbourne } 4½ p.c. Deb.	101—103	..	4 17 1
541,920	20	Nov. 11	3½	Monte Video, Ltd.	11½—12½	..	5 12 0
1,565,892	Stk.	Feb. 24	4¼	Newc'tle & G'tesh'd Con.	109—111	..	4 3 4
406,625	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.	92—93	..	3 15 3
15,000	10	Feb. 24	10	North Middlesex 10 p.c.	19—20	..	5 0 0
52,940	1	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	Nov. 30	8	Oriental, Ltd.	148—151	..	5 6 0
600,000	5	Mch. 30	7	Ottoman, Ltd.	6—6½	..	5 12 0
235,005	Stk.	—	6½	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	6†	Primitiva Ord.	6—6½	..	4 12 4
796,980	5	Jan. 27	5	Do. 5 p.c. Pref.	5—5¼	..	4 15 3
488,900	100	Dec. 1	4	Do. 4 p.c. Deb.	96—98	..	4 1 8
851,070	10	Oct. 13	7	River Plate Ord.	13—13½	..	5 3 8
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	97—99	..	4 0 10
250,000	10	Apl. 13	7	San Paulo, Ltd.	12½—13*	..	5 7 8
70,000	50	Jan. 3	5	Do. 5 p.c. Deb.	52—54	..	4 12 7
135,000	Stk.	Mar. 15	10	Sheffield A	234—236	..	4 4 9
209,984	,,	,,	10	Do. B	234—236	..	4 4 9
523,498	,,	,,	10	Do. C	233—235	..	4 5 1
123,998	Stk.	Mch. 30	5	Shrewsbury Ord. 5 p.c.	102—105	..	4 15 3
70,000	10	,,	11	South African	16—17	..	6 9 5
6,250,000	Stk.	Feb. 10	5½	South Met., 4 p.c. Ord.	127—129	..	4 5 3
1,832,700	,,	Jan. 13	3	Do. 3 p.c. Deb.	89—91	..	3 5 11
575,000	Stk.	Feb. 24	5½	S'th Suburb'n Ord. 5 p.c.	120—123	..	4 9 5
60,000	,,	,,	5	Do. 5 p.c. Pref.	122— 27	..	3 18 9
112,533	,,	Jan. 13	5	Do. 5 p.c. Deb. Stk.	130—135	..	3 14 1
502,310	Stk.	Nov. 11	5	Southampton Ord.	107—110	..	4 10 11
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Feb. 24	6½	Tottenham } A 5 p.c.	125—128	..	4 17 8
338,720	,,	,,	4¾	and } B 3½ p.c.	98—101	..	4 14 1
125,000	,,	Dec. 15	4	Edmonton } 4 p.c. Deb.	107—110	..	3 12 9
182,380	10	,,	8	Tuscan, Ltd.	9½—10½	..	7 16 1
149,900	10	Jan. 3	5	Do. 5 p.c. Deb. Red.	100—102	..	4 18 0
30,000	Stk.	Feb. 24	7½	Wands-worth and Putney } A 5 p.c. B 3½ p.c. C 3½ p.c. 3 p.c. Deb. Stk.	163—168	..	4 12 3
255,636	,,	,,	6¾		135—140	..	4 9 3
60,000	,,	,,	5⅛		111—113	..	4 16 0
57,564	,,	Dec. 30	3		82—87	..	3 9 0
745,872	,,	Mch. 15	5	West Ham 5 p.c. Ord.	102—104	..	4 16 2
185,000	,,	,,	5	Do. 5 p.c. Pref.	123—126	..	3 13 4
193,300	,,	Dec. 30	4	Do. 4 p.c. Deb. Stk.	105—110	..	3 12 0

Prices marked * are Ex div. † Next dividend will be at this rate.

OXIDE OF IRON.

O'NEILL'S OXIDE has a larger annual sale than all other Oxides combined.
SPENT OXIDE purchased in any district.
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WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

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HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

GAS TAR wanted.
BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
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BIGGS, WALL, & CO., 13, Cross Street,
Finsbury, E.C. *Telegrams:* "RAGOUT," LONDON.
Telephone: 273 CENTRAL.
SATURATORS—See Advt. in last week's issue.
EXHAUSTING MACHINERY—See Advt. in this week's issue.
SULPHATE PLANTS—See Advt. in next week's issue.

THE KEITH LIGHT.
OVER 1600 INSTALLATIONS IN DAILY USE.
SEE illustrated advertisement in next week's issue.
JAMES KEITH AND BLACKMAN CO., LTD., 27, Farringdon Avenue, LONDON, E.C.

"NUGEPE" GAS PLANT CEMENT.
JOHN E. WILLIAMS AND CO.,
LOWER MOSS LANE,
MANCHESTER, S.W.
For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

SPENT OXIDE.
THE South Metropolitan Gas Company are always open to receive OFFERS of SPENT OXIDE.
Chief Office: 709, Old Kent Road, London, S.E.
Telegrams: "METROGAS, LONDON."

AMMONIACAL Liquor wanted.
BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

GLASS SHADES of every description, for all kinds of Interior **GAS LIGHTING.**
Illustrated sheets on application.
JOHN WALSH WALSH,
SOHO AND VESTA GLASS WORKS, BIRMINGHAM.
Telegrams: "VESTA, BIRMINGHAM."
National Telephone: No. 63.
London Show-Room: 4, HOLBORN CIRCUS, E.C.

GAS TAR and AMMONIACAL LIQUOR wanted by
GEORGE MILLER AND CO., Tar Distillers,
40, West Nile Street, GLASGOW.

GASHOLDER PAINTING.
PAINTING Work for all kinds of Gas- Works Plant undertaken by contract or otherwise.
FREDERICK BOYALL, 31, Regent's Row, Queen's Road, DALSTON, N.E. Established 1850.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 54 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 254 Oldham, and 2412 HOP, London.
Telegrams:—
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DUTCH OXIDE OF IRON.
SPENT OXIDE PURCHASED IN ANY DISTRICT.
THE First Dutch Bogore Co., Ltd., HOLLAND.
General Manager (for England and Wales)—
CHARLES E. FRY, LEAMINGTON.
General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

BROTHERTON & CO., LIMITED.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

PIPE Main and Foundry Castings AGENCY wanted by a City Firm with good Connection among Gas and Water Companies.
Address No. 4383, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

REQUIRED, by a Gentleman, a position as MANAGER or MANAGER and SECRETARY of a moderate size Gas-Works. Over Thirty Years' experience of Gas-Works and the laying down of Plant.
Highest references to No. 4384, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

YOUNG Man wants situation as Gas- FITTER. Five Years' Experience at Gas-Works. Used to Iron and Compo. Had considerable Experience in Slot Installations, Incandescents, &c. Age 21.
Address J. W. GIBSON, Gas Cottages, London Road, Wellingborough, NORTHANTS.

OUTDOOR SUPERINTENDENT.
AN Energetic, Tactful Man, Age 35, who has for the last Ten Years successfully Managed a small Gas Undertaking, will shortly be free and prepared to take over a post as above. Well up in Main and Service Laying, General Gas-Fitting, able to advise on all matters connected with uses of Gas, prepare Estimates, and able to take Sole Charge of the Distribution Department. Moderate Salary.
Address No. 4372, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

LARGE Berlin Incandescent Mantle Factory wants AGENT with good Connection among Factors and Wholesale Houses.
Apply, by letter, to No. 4386, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Engineer of an Urban District Council Gas-Works has a vacancy for a PUPIL, about 17 (Premium required). Must be a good Scholar, and have a desire for Engineering.
Address No. 4382, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, for Three or Four Months only, a Young Man capable of acting as CLERK OF WORKS and Supervising, in the absence of the Engineer, Alterations and Additions that are to be made to a Gasholder and other Structural Ironwork. Wages, £2 2s. per week.
Apply, by letter, stating Age, Experience, &c., to No. 4385, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

LONGTON CORPORATION GAS-WORKS.
CARBONIZING AND WORKS FOREMAN.
WANTED, immediately, an experienced and reliable man as General CARBONIZING and WORKS FOREMAN. Thoroughly steady, and accustomed to Regenerative Settings, Sulphate of Ammonia Plant, Stoking Machinery, and Carburetted Water-Gas Plant. Must have held a similar appointment.
Wages £2 per week, with House, Coal, and Gas free.
Apply, with not more than Three References, stating previous Experience and Age, not later than May 1, to
W. LANGFORD.
Engineer and General Manager.

TO LET ON HIRE
CYLINDRICAL Tank - Waggons, suitable for the carriage of Benzol or Crude Naphtha.
Apply to the CLAYTON ANILINE COMPANY, LIMITED, Clayton, MANCHESTER.

NEW Gasholder, 40 ft. diameter by 12 ft. deep, with Steel Standards; also new STEEL TANK to contain same.
Write J. WRIGHT, 181, Queen Victoria Street, LONDON, E.C.

TEST PLANT FOR SALE—We have several small Sets of GAS APPARATUS suitable for Test Plants, including Retorts, Condensers, Scrubber, Purifiers, Gasholders, overhauled and guaranteed, or New throughout.
FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

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(NATURAL.)
BALE & CHURCH will be pleased to send Quotations and Samples on application.
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT for all Retort and Furnace work.
PAINT for Gasholders, Purifiers, &c.
5, CROOKED LANE, LONDON, E.C.

SULPHURIC ACID.
SPECIALLY prepared for the Manu- facture of SULPHATE OF AMMONIA.
SPENCER, CHAPMAN, AND MESSEL, LIMITED, 36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341, AVENUE.

PURIFIERS, &c., FOR SALE—Sets of 4 ft., 5 ft., 6 ft., 8 ft., 9 ft., 10 ft., 12 ft., 18 ft. squares; also 16 ft. by 12 ft., &c. SCRUBBERS, 8 ft. by 60 ft. 10 inch, 18 inch Square METERS. EXHAUSTERS up to 50,000 feet per hour in Stock. GASHOLDERS and TANKS, also New. State requirements
FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE—9 Tons of Carbon. Can be put on Rail at Chertsey Station.
Apply to the MANAGER, Gas-Works, CHERTSEY.

REDDITCH GAS COMPANY.
CONDENSER for Sale (water cooled), faced joints. First-Class Condition. Capacity 250,000 per day.
Particulars, &c., from A. E. LAYTON, Manager.

LEIGH-ON-SEA URBAN DISTRICT COUNCIL.
THE Leigh-on-Sea Urban District Council invite TENDERS for the supply of 1000 Tons of good GAS COAL, to be delivered at the Gas-Works Wharf, Leigh-on-Sea, as required in quantities of not more than 80 Tons.
Sealed Tenders, endorsed "Tender for Coal," must be received by me not later than Twelve o'clock noon on Wednesday, the 3rd day of May next.
The Council do not bind themselves to accept the lowest or any Tender.
W. CARLYLE CROASDELL,
Clerk to the Council.
Council Offices, Leigh-on-Sea,
April 19, 1905.

LOUTH GASLIGHT COMPANY.
TENDERS FOR GAS COAL.
THE Directors of the Louth Gaslight Company invite TENDERS for the supply of 4000 Tons (more or less) of GAS COAL required at their Works during a period of One Year.
Forms of Tender, with Specification, may be obtained on application to the Secretary.
Sealed Tenders, endorsed "Tender for Coal," addressed to the Chairman of the Directors, Louth Gas Company, Louth, to be sent to the Secretary on or before May 6 next.
The Directors do not bind themselves to accept the lowest or any Tender.
PHILIP ALLISON,
Secretary.

THE Widnes Corporation are prepared to receive TENDERS for the supply of about 30,000 Tons of GAS COAL (Slack, "Through and Through," or Screened Coal) for the Year ending June 30, 1906, to be delivered at the Gas-Works, Widnes.
Conditions and Forms of Tender may be obtained from Mr. Isaac Carr, M.Inst.C.E., Gas Engineer, Widnes.
Tenders, endorsed "Gas Coal," to be delivered to the undersigned not later than noon of Tuesday, the 2nd prox.
The Corporation do not bind themselves to accept the lowest or any Tender.
H. S. OPPENHEIM,
Town Clerk.
Town Hall, Widnes,
April 17, 1905.

NEWTON-IN-MAKERFIELD URBAN DISTRICT COUNCIL.
TENDERS FOR GASHOLDER.
THE above-named Council invite TENDERS for the Construction of a Two-Lift GASHOLDER, 60 feet in diameter, with Alterations to TANK.
Plans and Specification may be inspected at the Office of the Gas Engineer, Mr. Arthur Bowes, Assoc.M.Inst.C.E., Town Hall, Earlstown.
Tenders, addressed to the Chairman of the Gas Committee, must be delivered at my Office not later than the 6th of May next.
The Council do not bind themselves to accept the lowest or any Tender.
C. COLE,
Clerk to the Council.
Town Hall, Earlstown,
April 19, 1905.

ROBERT DEMPSTER & SONS, Ltd., Contractor for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

COALVILLE URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Chairman and Gas Committee of the above Council invite TENDERS for the supply of a Steel GASHOLDER and TANK, and its erection at the Gas-Works, Whitwick.

Specifications and Drawings may be seen, and Particulars to be had, by applying to Jos. W. Eagles, Gas Office, Whitwick.

The Committee do not bind themselves to accept the lowest or any Tender.

Tenders, endorsed "Gasholder," to be addressed to the Chairman on or before May 1, 1905.

JOS. W. EAGLES,
Manager.

MANCHESTER CORPORATION GAS DEPARTMENT.

TO EXHAUSTER AND ENGINE MAKERS.

THE Gas Committee are prepared to receive TENDERS for the work required to be done in the Supply, Delivery, and Erection of a Twin Set of EXHAUSTERS and ENGINE, at their Bradford Road Station.

Specification and Tender Form may be had on application (in writing only) to Mr. C. Nickson, Superintendent, Gas Department, Town Hall. Any other Information required may be obtained on application to Mr. J. G. Newbigging, C.E., at his Office, Rochdale Road Station.

The Committee do not bind themselves to accept the lowest or any Tender.

Sealed Tenders, addressed to the Chairman of the Gas Committee, and endorsed "Exhausters and Engine," must be delivered at the Gas Offices, Town Hall, Manchester, not later than Ten a.m. on Saturday, May 13, 1905.

By order,
WM. HENRY TALBOT.
Town Clerk,

Town Hall, Manchester,
April 20, 1905.

TO ENGINEERS, IRONFOUNDERS, AND OTHERS.

THE Corporation of Birkenhead are prepared to receive TENDERS for the supply and erection of Cast-Iron PURIFIERS, Connections, Centre Valve, Superstructure and Roof, and Oxide ELEVATOR and CONVEYOR at their Gas-Works, Thomas Street.

The Site of Works and Drawings may be inspected, and detailed Specification obtained (on deposit of One Guinea), upon application to the Engineer, Mr. T. O. Paterson, at the Gas-Works.

Tenders, sealed and endorsed "Tenders for Purifiers," to be sent in to me not later than Five p.m. on Thursday, May 4, 1905.

The person whose Tender may be accepted will be required to enter into a contract containing a clause as to the payment of the rate of wages, and the observance of the hours of labour recognized and agreed upon between the Trades Unions and the employers in the locality in which the work for carrying out the contract is to be performed.

The Corporation do not bind themselves to accept the lowest or any Tender.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
April 20, 1905.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Corporation of Birkenhead are prepared to receive TENDERS for the supply of COAL, COAL NUTS, and Through and Through CANNEL for Gas-Making purposes for a period of Twelve Months, commencing from the 1st of July, 1905.

Forms of Tender, together with any further Information, may be obtained from Mr. T. O. Paterson, C.E., Gas Engineer, Gas-Works, Birkenhead.

Tenders (accompanied by copy of recent Analysis) stating the price per Ton, delivered on to the Gas-Works Railway Siding, must be sent in to me, sealed and endorsed "Tender for Gas-Works Coal," not later than Five o'clock in the Afternoon of Thursday, the 18th of May, 1905.

Also for the supply of screened COAL, washed SLACK, or small COAL, to be delivered at the Pumping-Stations of the Spring Hill, Flaybrick Hill, Borough Road, Mount Road, and the Ford Water-Works, for a period of Twelve Months, commencing from the 1st of July, 1905.

Forms of Tender, together with any further Information, may be obtained from Mr. J. W. M. Richardson, C.E., Assistant Water Engineer, 52, Balls Road, Birkenhead.

Tenders, stating the price per ton delivered at the various Pumping-Stations, must be sent in to me, sealed and endorsed "Tender for Water-Works Coal," not later than Five o'clock in the Afternoon of Thursday, the 18th of May, 1905.

All deliveries to be made from time to time according to the requirements of the respective Engineers.

The parties whose Tenders may be accepted will be required to enter into a Contract containing a clause as to the payment of the rate of wages, and the observance of the hours of labour recognized and agreed upon between the Trade Unions and the employers in the locality in which the work for carrying out the contract is to be performed.

The Corporation do not bind themselves to accept the lowest or any Tender.

By order,
ALFRED GILL,
Town Clerk.

Town Hall, Birkenhead,
April 20, 1905.

BOROUGH OF WOKINGHAM.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of 1500 Tons of GAS COAL, screened or unscreened, to be delivered during One Year from the end of May next.

Sealed Tenders to be delivered at the Gas Office not later than Tuesday, May 2, 1905, addressed to the Chairman of the Gas Committee, and endorsed "Tenders for Coal."

No Tender Forms supplied.

By order,
H. C. MYLNE,
Chairman.

April 19, 1905.

TO PIPE FOUNDERS.

THE Directors of the Radcliffe and Pilkington Gas Company invite TENDERS for the undermentioned Cast-Iron Spigot and Socket PIPES—viz.

640 Yards of 6-inch Pipes.
840 Yards of 4-inch Pipes.

and a few SPECIALS.

Particulars may be obtained from the undersigned, by whom Tenders will be received until Tuesday, May 2 next.

JAMES BRADDOCK,
Manager and Secretary.

Gas-Works, Radcliffe,
April 18, 1905.

THE Directors of the Camborne Gas Company, Limited, invite TENDERS for 1000 Tons of GAS COAL, to be delivered f.o.b. to their order between May 30, 1905, and May 30, 1906.

No Form of Tender is issued; and competing Firms will kindly accept the absence of any advice up to May 4 as an intimation that their Tender has not been accepted.

Tenders should be sent to the undersigned on or before May 1.

The lowest or any Tender will not necessarily be accepted.

W. BAILEY,
Secretary and Manager.

Camborne, April 19, 1905.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
FELIXSTOWE GAS LIGHT COMPANY.

NEW ISSUE OF £5000 ADDITIONAL ORDINARY STOCK, AND £1000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 16, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
LOWESTOFT WATER AND GAS COMPANY.

NEW ISSUE OF 400 ADDITIONAL ORDINARY £10 SHARES,

Ranking for a Maximum Dividend of 7 per cent., previous Issues of similar Shares now receiving 5½ per cent.; also

£1000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 16, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.

NEW ISSUE OF £15,000 ORDINARY "C" STOCK. Ranking for a Standard Dividend of 3½ per cent. subject to the Sliding-Scale; the last Dividend on the Company's existing "C" Stock having been at the rate of £5 8s. 6d. per cent. per Annum.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 16, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

GAS AND WATER ORDINARY STOCKS AND SHARES
IN THE
SOUTHEND WATER-WORKS COMPANY.
CHIGWELL, LOUGHTON, AND WOODFORD GAS COMPANY.
SOUTH-WEST SUBURBAN WATER COMPANY.
WOKINGHAM DISTRICT WATER COMPANY, LIMITED,

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, May 16, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

BRIGHOUSE CORPORATION.

EXHAUSTER.

THE Gas Committee are prepared to receive TENDERS for a ROTARY GAS EXHAUSTER and Vertical STEAM-ENGINE combined, to pass 60,000 cubic feet of Gas per hour, with Inlet and Outlet Valves, Steam-Governor, and Throttle Valve complete, delivered and fixed on foundation prepared by the Gas Committee, at the Mill Lane Gas-Works, Brighouse.

Sealed Tenders to be sent in not later than Twelve o'clock noon on Monday, May 8, 1905, addressed to the undersigned, and endorsed on the outside "Tender for Gas-Exhauster."

The lowest or any Tender not necessarily accepted.

By order,
JAMES PARKINSON,
Engineer.

Municipal Offices, Brighouse,
April 19, 1905.

Now Ready, pp. 584 and XVI. 251 Illustrations. F'Cap. Quarto, Price 18s. net (Post Free).

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FOR

GAS ENGINEERS AND MANAGERS

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In almost every department additions have been made; and it is believed that the labour bestowed on its production will enhance the Value of the book as a Work of Reference.

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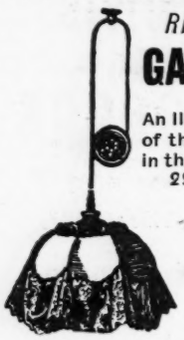

An Illustrated Description of this Pendant appeared in the "Journal" for Nov. 22, 1904 (page 599).

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Highest Results in Gas, & Excellent Coke.
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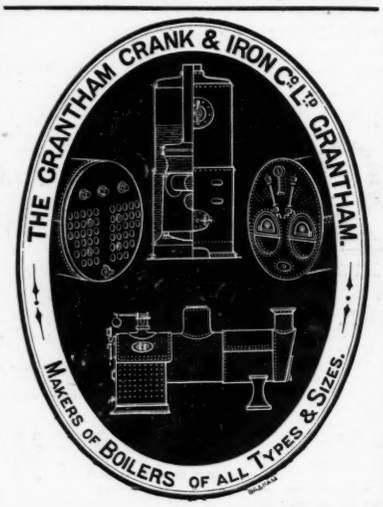

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Rich in Illuminating Power and yield of Gas.
Above the Average in Weight and Quality of Coke.
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VOL. LXXXIX.

OF THE

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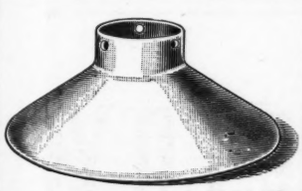

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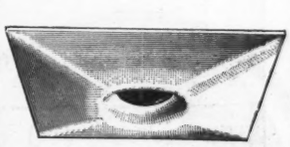

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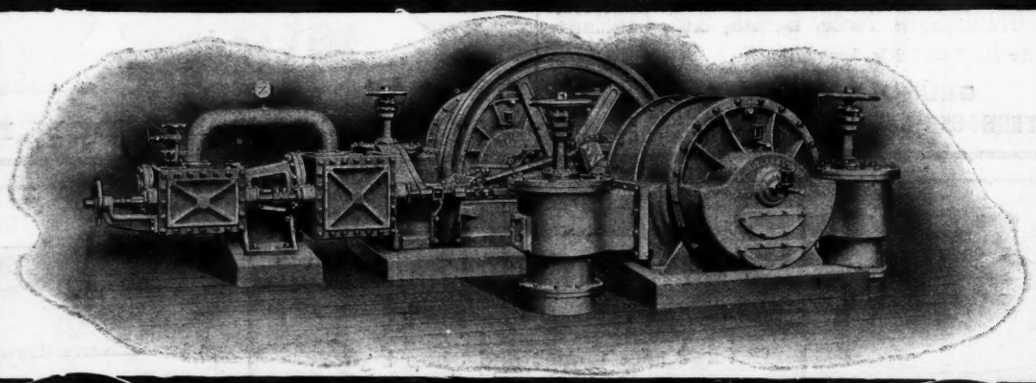

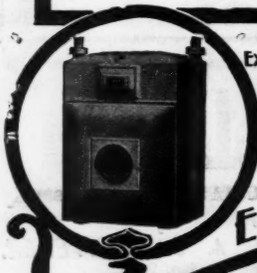

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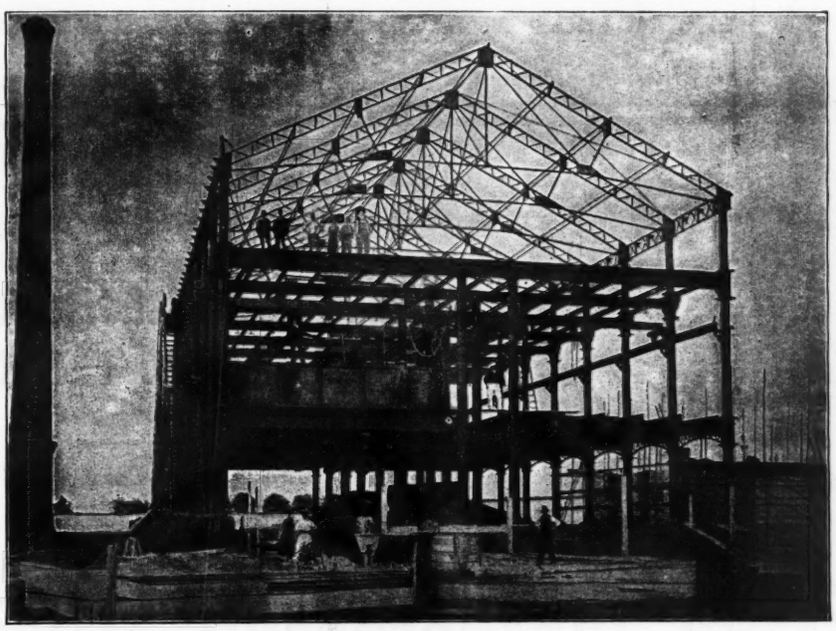

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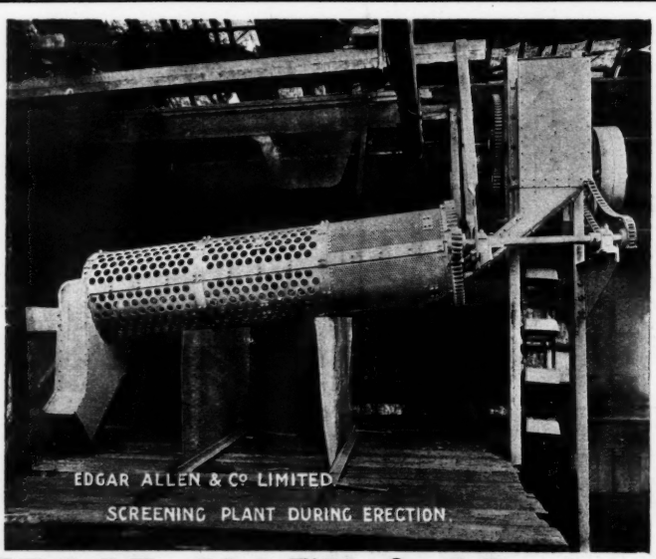
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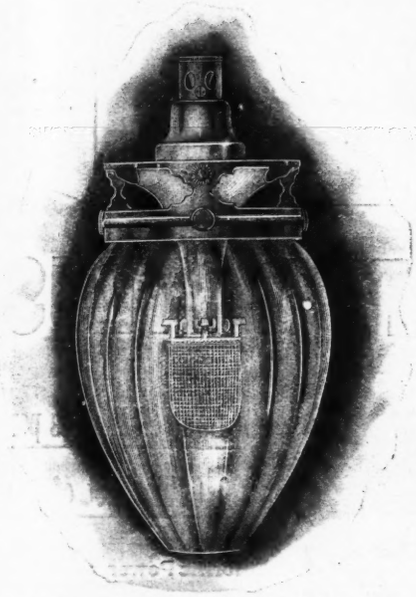

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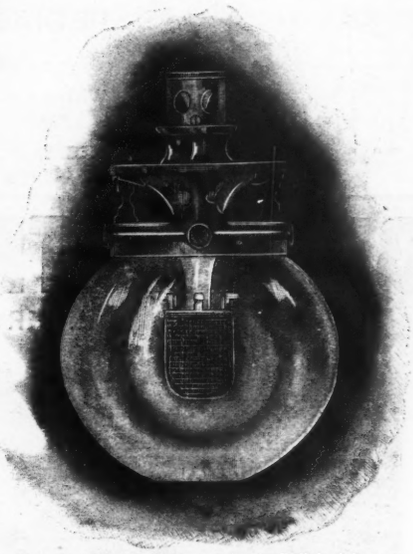

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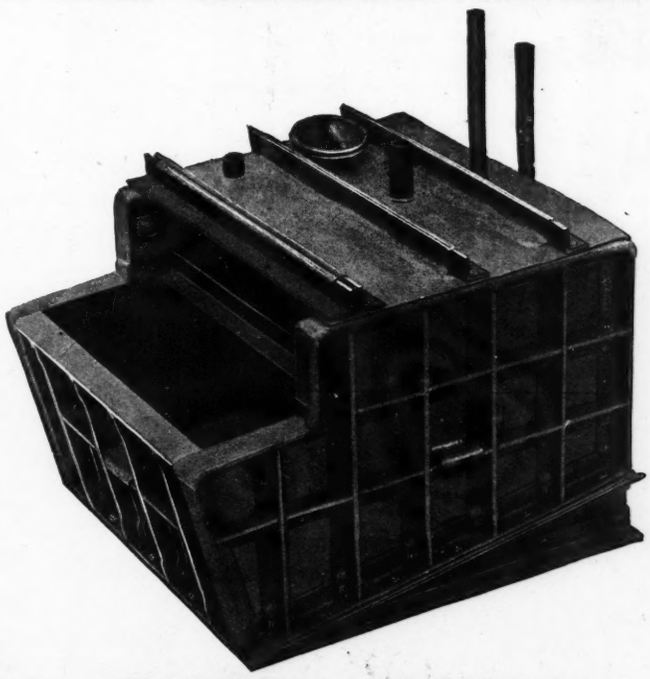

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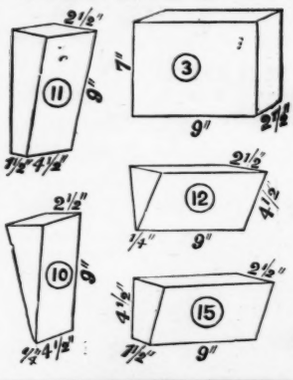

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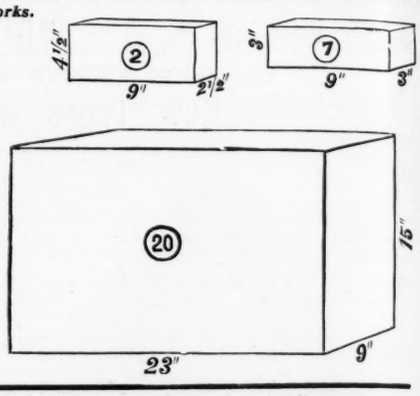
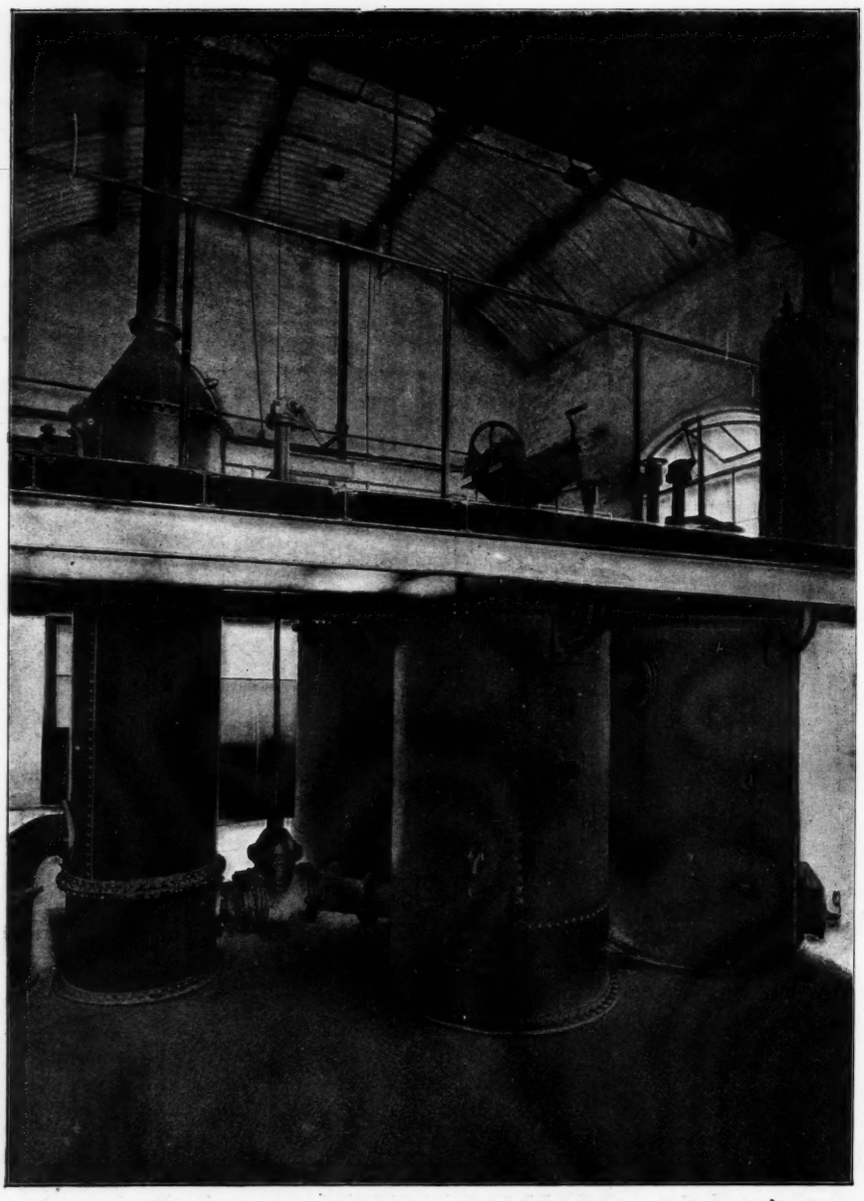


BLUE WATER-GAS APPARATUS

(DR. KRAMERS & AARTS PATENTS).



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O_2	0·2
CO	45·0
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Difference	3·3

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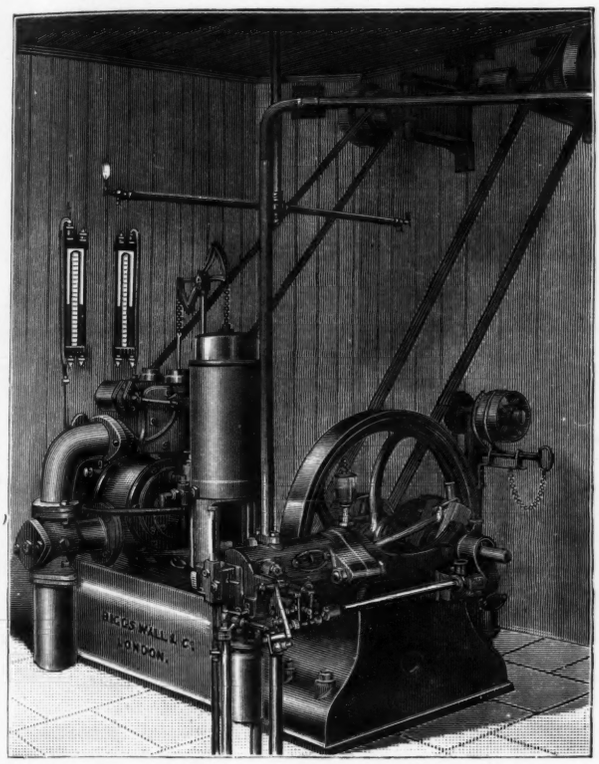

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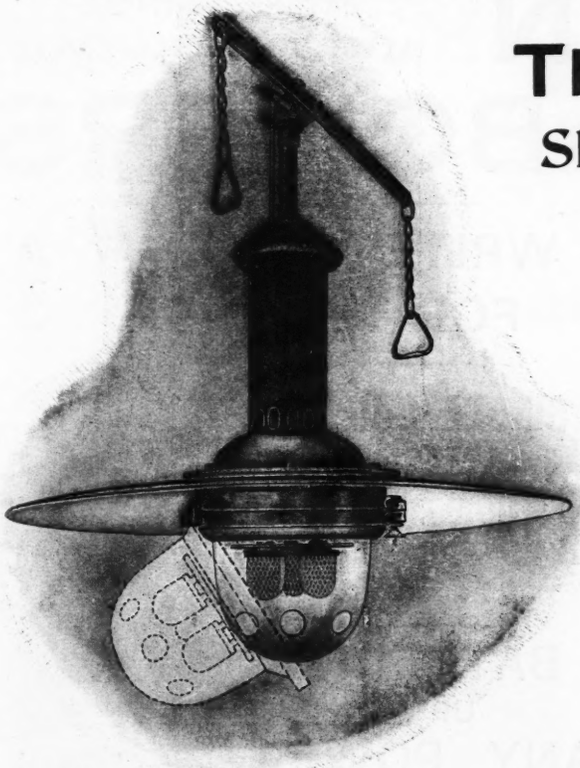

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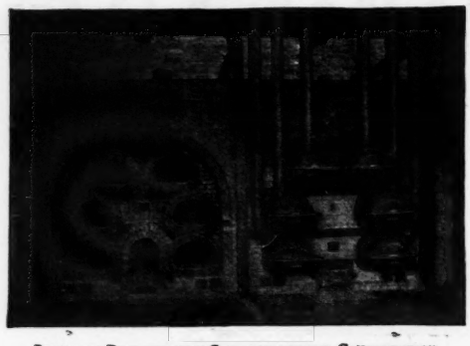

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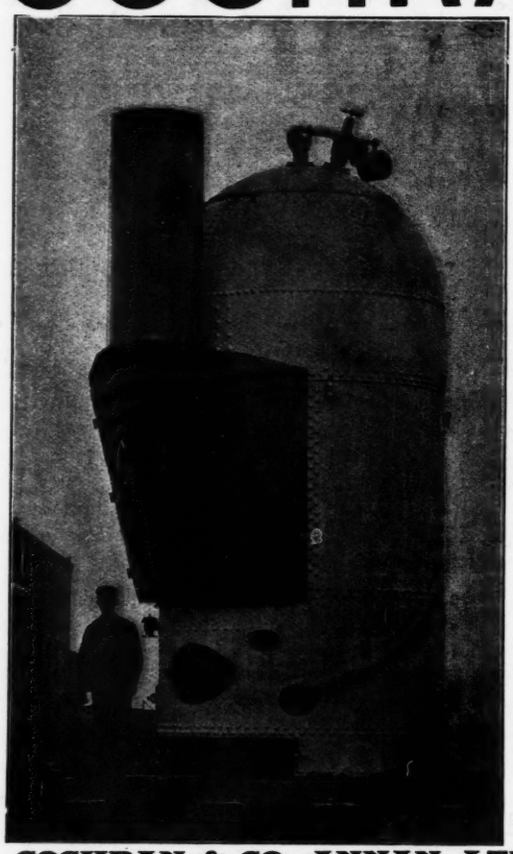

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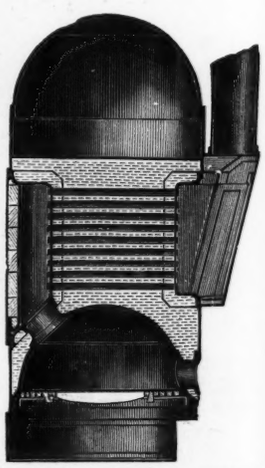

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